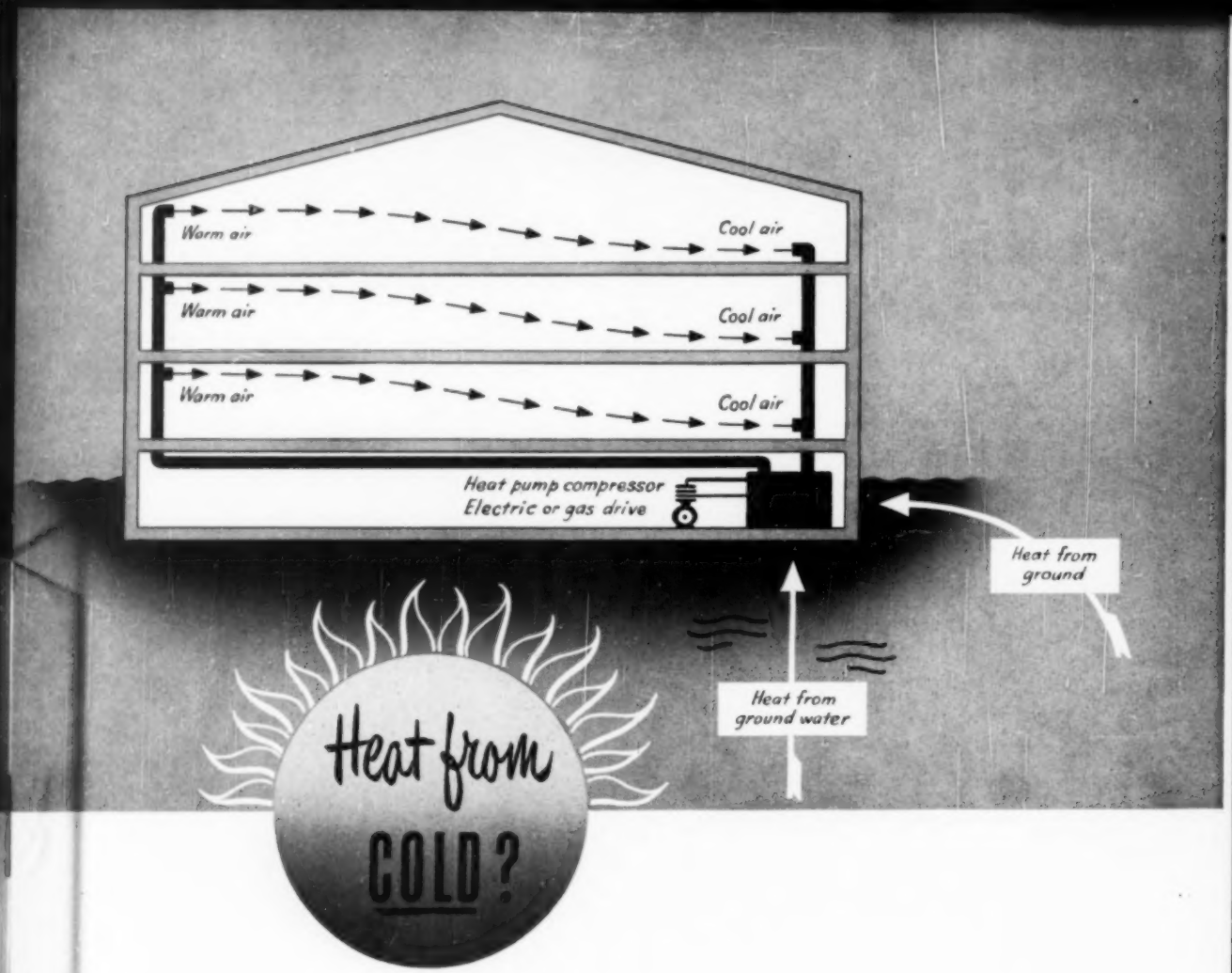
DECEMBER, 1949 Vol. 38, No. 10

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

PRE-CONVENTION NUMBER



People are so accustomed to building a blazing fire when they want comfort that it is hard for them to believe there is enough warmth in the cold, cold ground to heat a house comfortably all winter long. Yet this is a fact. And there are a number of devices now on the market to use ground heat by simply reversing the usual application of the electrical refrigerator principle.

Here is an example of an oft-repeated truth, that value, usefulness, resource, even wealth exist in unexpected or unlikely places. It was long thought that only youngsters of "good" birth or heritage possessed the traits that lead to success and outstanding achievement in life. Perhaps it was only experimentally that the founding fathers used the phrase, "all men are created equal". But modern education shows we have only *begun* to penetrate to the full truth of that statement.

Heat from cold? Value in unlikely places? There is no absolute zero and no unlikely circumstance where the dynamics of human nature are involved. There is only unplumbed potential and undeveloped power. This is the opportunity seized largely by every educator worthy of that title. The true educator knows he is not a classroom clerk, not a traffic cop in the arteries of routine instruction, but an architect of careers, a builder of tomorrow's men. He kindles the flame of ambition from the first spark of interest shown. By his own conduct, he creates standards and attitudes that last a lifetime.

Such a man will never suggest the subject he teaches is unimportant . . . by suggesting its tools are unimportant. To the contrary, he will show clearly his respect for fine craftsmanship as represented by a time-honored name. Drawing instruments, for example, can be a challenge to perfection, an inspiration to achievement, and an unending lesson in pride of performance when discriminating choice rather than careless acceptance attends their selection.

EUGENE DIETZGEN CO.

Chicago • New York • San Francisco • New Orleans • Los Angeles
Pittsburgh • Washington • Philadelphia • Milwaukee

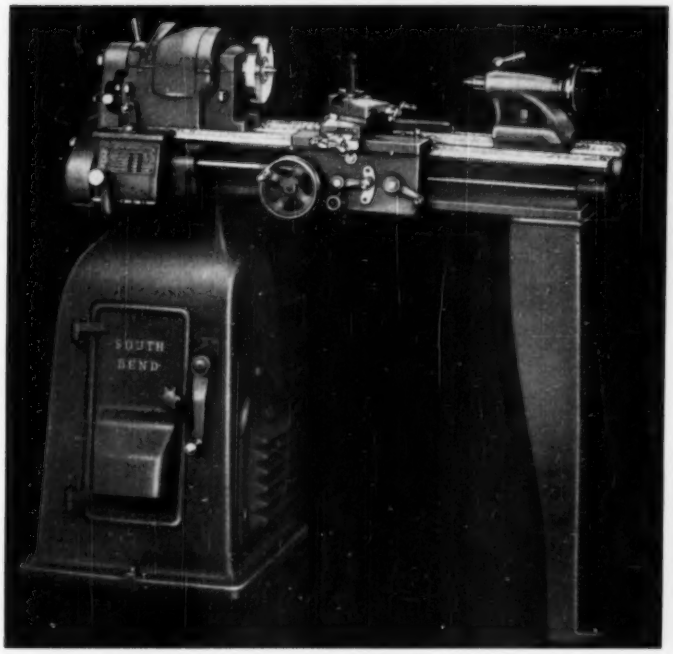
Dealers in All Principal Cities

DIETZGEN

EVERYTHING FOR DRAFTING AND SURVEYING

Easier to Operate

SOUTH BEND LATHES



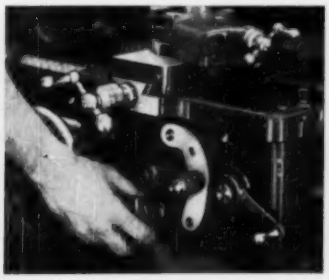
In commercial shops where several makes of lathes are available, there is a noticeable preference shown for South Bend Lathes. Experienced mechanics are partial to them largely because they are easier to operate, although their precision, versatility, and efficiency are also greatly appreciated. And ease of operation is even more important in the school shop, because it contributes so much to the confidence of the beginner.

If you are planning a new shop installation or need additional equipment, write for a copy of our complete catalog and the name of our distributor located nearest you. He will gladly assist you without obligation.

Lathe Illustrated Above — 10" x 3-1/2' Quick Change Gear Lathe with 3 ph., 60 cy., 220 V., 3/4 h.p. motor and drum switch — f.o.b. factory — **$825.35**

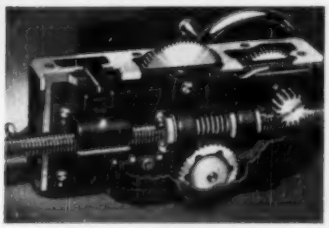
SOUTH BEND LATHE WORKS

BUILDING BETTER TOOLS SINCE 1906 • 466 E. MADISON ST., SOUTH BEND 22, IND.



Simple, Positive-Action Controls for Easy Machine Handling

South Bend Apron Controls are conveniently positioned for fast, easy operation. Each control has a distinctive shape that is instantly recognizable by touch. The cross-feed screw and compound rest screw are equipped with micrometer collars having clear cut, easy reading graduations. Power feeds are engaged through a friction clutch that will not slip under load. An automatic interlocking safety device prevents simultaneous engagement of opposing feeds.



Rugged Double-Wall Apron for Trouble-Free Service

This is an interior view of the apron used on all 10" and larger South Bend Lathes. There's nothing complicated about it... and it will give dependable service with a minimum of maintenance. The heavy, one-piece, double-wall construction provides rigid support for both ends of gear shafts.

A large oil reservoir provides ample lubrication, with only occasional attention. Half-nuts are close-coupled, and are dovetailed into the back wall of the apron.

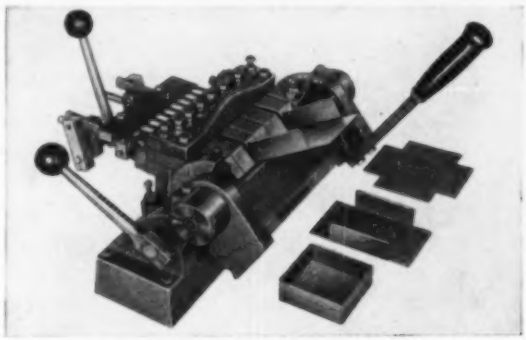
FINE TRAINING...

rates Snap-on Tools

Your students are the skilled mechanics of the future . . . the logical reason why you should acquaint them during their training period with fine Snap-on Tools — the choice of better mechanics everywhere. Using modern Snap-on Tools means early development of superior workmanship, speed, dexterity. These are attributes that reflect credit to you in growth of students to capable mechanics.

SNAP-ON TOOLS CORPORATION

8074-L 28TH AVENUE KENOSHA, WISCONSIN



A BOX FORMING PROJECT

with NEW DI-ACRO BOX FINGER BRAKE and DI-ACRO NOTCHER

Here is an interesting and practical student training project which teaches ingenuity in forming methods with modern equipment. Step. I. The four corners of the flat material are notched with the DI-ACRO Notcher (not illustrated). Step II. Two sides of the box are formed with the DI-ACRO Brake as shown. Step III. The box fingers are easily adjusted to allow the previously formed sides to enter, while last two sides are formed.

Send for **40 PAGE CATALOG** describing "Die-Less Duplicating" with all six DI-ACRO Precision machines — Benders, Brakes, Shears, Rod Parters, Notchers, Punches — and showing many examples of duplicated parts.

← Pronounced "Die-Ack-Ro"

DI-ACRO PRECISION MACHINES DIE-LESS DUPLICATING **O'NEIL-IRWIN MFG. CO.**

351 — 8th AVE., LAKE CITY, MINN.

ARMSTRONG

New TOOL HOLDERS MAKE MORE PROFIT ON EVERY OPERATION

With ARMSTRONG TOOL HOLDERS you can take advantage of the new high speeds and heavier feeds of the newer cutting materials, without revolutionary changes or costly experimentation. They are the most profitable tools obtainable; the lowest in initial cost, the longest in service and most economical in use, for all incorporate the basic ARMSTRONG Principle of small interchangeable cutter-bits in permanent drop forged shanks. They are the most readily obtainable tools, too, for they are stocked by all leading distributors.

WRITE FOR CIRCULARS DESCRIBING

(1) ARMSTRONG Carbide TOOL HOLDERS and ARMIDE (Carbide Tipped) Cutters.

(2) ARMSTRONG C A TOOL HOLDERS and ARMALOY (Cast Alloy) Cutter-bits.

Write for NEW S-48 Catalog just released.

ARMSTRONG BROS. TOOL CO.

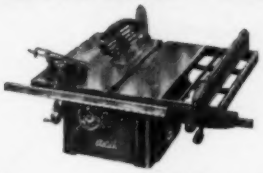
"The Tool Holder People"

5222 W. ARMSTRONG AVE. CHICAGO, 30 U.S.A.

New York • San Francisco

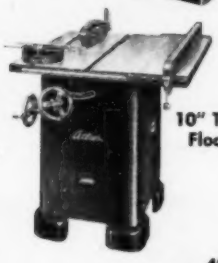
INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, December, 1949, Volume 38, No. 10. Published monthly, except July and August, by The Bruce Publishing Co., 540 N. Milwaukee St., Milwaukee 1, Wis. Entered as Second-Class Matter January 2, 1914, at the Post Office at Milwaukee 1, Wis., under the act of March 3, 1879. Subscription price in the U. S., Canada, and countries of the Pan-American Union, $3.00 per year; Foreign, $3.50; Single copies, 35 cents.

Atlas The NEW "Quality" Tools for School Woodworking Shops



8" - 10" Tilt/Arbor Bench Saws

24" Jig Saws



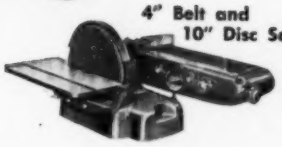
10" Tilt/Arbor Floor Saws

A.V.A. SHOW

See all the Atlas metalworking and woodworking tools.

Booths 45 - 47

4" Belt and 10" Disc Sanders



12" Wood Lathes

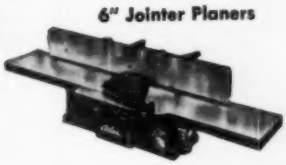
Every vocational educator who has seen them has commented most enthusiastically about these new Atlas tools. It means that you, too, have a pleasant surprise in store — should see them at your earliest opportunity.

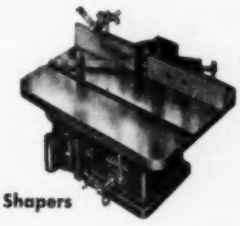
Most impressive to other vocational men have been (1) the immediately noticeable features of quality construction — the precision ground tables, the massive castings that provide extra stability for smooth operation and long wear, and the operating safeguards; (2) the many newly-engineered operating features that add to the capacity and versatility of the tools; (3) the careful precision workmanship on the tools that assures accurate operation, and the generous use of ball bearings to add smoothness and long service life. They have also been impressed that such good tools can be secured at low cost.

Your shop will be the showplace of the school with these big, new Atlas tools at the stations. And your students will undertake their courses with new enthusiasm for precise and careful workmanship with these Atlas tools to help them on their projects.

Your Atlas dealer will gladly arrange to show you all the new features of these tools, at your convenience. If there isn't a dealer in your city, send the coupon for new catalogs.

6" Jointer Planers





Spindle Shapers

FREE WALL CHARTS and LATEST CATALOG

ATLAS PRESS COMPANY
1271 N. Pitcher St., Kalamazoo, Mich.

Please send me the free Wall Charts offered in Industrial Arts, and your latest catalogs.

Name.....

School.....

Address.....

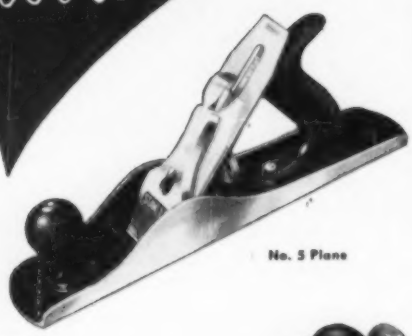
City, State.....

ATLAS PRESS COMPANY
1271 N. Pitcher Street, Kalamazoo, Michigan

Atlas POWER KING

MATCHED PRECISION TOOLS FOR MACHINING AND WOODWORKING

teach with good tools



No. 5 Plane

Stanley tools have long been the standard of school shops. They're the quality tools that shop instructors know best and buy most . . . the tools they prefer to use in teaching.

No. 118 All Steel Block Plane. "Boy-proof". Made in three units; cap, cutter and bottom, complete with locked-in adjustment. Parts can't be lost. 6" long, 1⅝", low angle cutter.

Stanley Nos. 5 and 5¼, and No. 118 planes are recommended especially for school shop use. Fast, clean-cutting action . . . easy adjustments, quality workmanship and balance. Specify Stanley Planes on your next tool requisition, the most for your tool dollar because they last so long. Stanley Tools, Educational Dept., 112 Elm Street, New Britain, Conn.

THE TOOL BOX OF THE WORLD

STANLEY

Reg. U. S. Pat. Off.

HARDWARE • HAND TOOLS • ELECTRIC TOOLS • STEEL STRAPPING

INDIVIDUALLY TESTED

TO INSURE BETTER PERFORMANCE

IMPROVED Spring Clamp
In three convenient sizes

"C" Clamps
Openings 1 in. to 14 in.

Hand Screw
All popular sizes

Quick Clamps
Openings 4 in. to 5 ft.

No. 640 IMPROVED "I" Bar Clamp
Openings 2 ft. to 10 ft.

VISIT OUR EXHIBIT AT THE AVA CONVENTION, BOOTH #87 AT ATLANTIC CITY, N. J.

HARGRAVE
CLAMPS

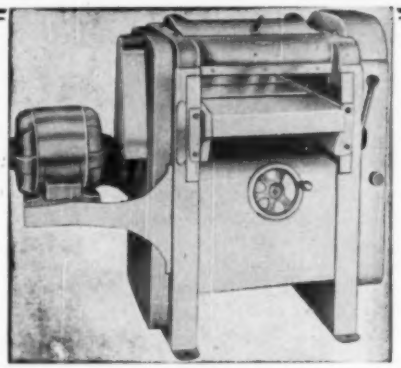
• Hargrave Clamps have been constantly improved with the aid of skilled mechanics to offer greater operating advantages and increased durability. Individually tested, they must be stronger, tougher and flaw-free. Made in openings from ¾ in. to 10 ft., from ⅛ in. to 16 in. deep.

WRITE FOR CATALOG showing the complete line of Hargrave Individually Tested Clamps, Chisels, Punches, Brace Wrenches, Star Drills, Washer Cutters, File Cleaners, etc.

Waverly & Main Aves.
Cincinnati 12, Ohio

HARGRAVE
Tested Tools
THE CINCINNATI TOOL COMPANY

TOOL UP WITH



WOODWORKER

NEW POWERMATIC BALL BEARING MOTOR DRIVEN

PLANER

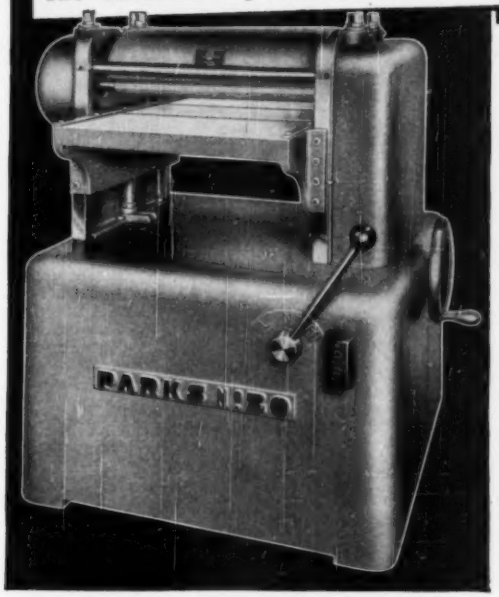
This heavy duty planer built to give trouble free service for many years. Capacity: ⅛" to 6" in thickness. Two rates of feed: 15 and 30 feet per minute. Completely equipped with safety devices.

Low priced: $671.00 with 3 H.P. single phase motor
620.00 with 3 H.P. three phase motor
635.00 with 5 H.P. three phase motor

Immediate delivery. Write for complete information.

WOODWORKERS TOOL WORKS
222 - 223 S. JEFFERSON ST. CHICAGO 6, ILLINOIS

The Sensationally NEW Low-Priced



PARKS No. 20
20" PLANER

Here is a modernly designed, rugged, high-speed, low-priced planer that is ideally suited for every shop and industrial plant requiring a quality surfacer. The Parks No. 20 Planer has a four-knife cutterhead with a speed of 3600 R.P.M. and offers two feed speeds — 20 and 40 F.P.M., and 40 and 80 F.P.M. Write for complete descriptive literature.

The PARKS Heavy-Duty 12" x 4" Planer

A compact, sturdy, thickness planer that offers mill planer precision and ruggedness at a sensationally low price. Write for descriptive catalog sheet.

The PARKS WOODWORKING MACHINE CO., Dept. 22-JJ, 1546 Knowlton St., Cincinnati 23, O.

FOLEY *Automatic* SAW FILER

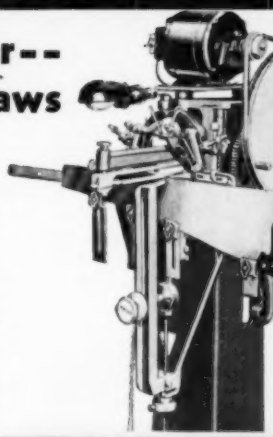
Trains Your Students Better-- DOUBLES Life of Your Saws

"ONE OF THE BEST MACHINES WE HAVE FOR TRAINING PURPOSES" —Samuel Gompers Trades School, San Francisco

The Foley is the only machine that files and joints all hand, back and mitre box saws from 3 to 16 points per inch, cross-cut circular saws up to 16" diameter (24" optional), and band saws up to 24' long. Patented jointing principle automatically evens up large and small teeth, so saws cut faster, truer, cleaner — stay sharp longer.

With a Foley Automatic Saw Filer you can sharpen your saws more perfectly than is possible by hand. You can do it quicker, — and your saws will stay sharp longer. Your students will turn out better work with sharp saws. ALSO by keeping your saws sharp with a Foley, — you will easily double their cutting life and have less breakage, reducing replacements to a minimum.

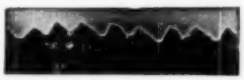
Train your students to file saws on a Foley, for they will find thousands of Foley Saw Filers used in industry, Army, Navy, Air Corps, etc. Hundreds of schools and colleges use them to save on saw filing costs and replacement expense.



TYPICAL SCHOOL USERS
Berea College, Berea, Ky., Board of Education, Cleveland, Ohio; Boys Technical H. S., Milwaukee, Wis.; Charleroi School District; Charleroi, Pa.; Redlands Public Schools, Redlands, Calif., Stout Institute, Menomonie, Wis.

30-DAY TRIAL OFFER
You may have the privilege of using a Foley Saw Filer in your own shop for 30 days, — and see for yourself its training advantages and operating economies. Send coupon for details.

The FOLEY SAW FILER *Makes . . .*



an OLD SAW

LIKE NEW!

Send in this Coupon

FOLEY MFG. CO., 3318 N.E. 5th Street Minneapolis 18, Minn.
Please send literature on the Foley Automatic Saw Filer and details of your 30-Day Trial.

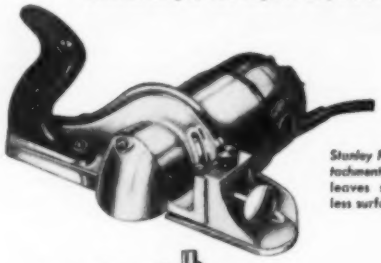
Name .....

Address .....

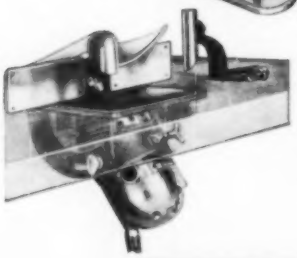
NEW
Stanley No. 28
Router-Shaper

Router, shaper and power plane — all in one tool

Now you can teach your students the use of three important woodworking tools with an investment in only one motor. This new high quality, ½ H.P. motor — 18,000 r.p.m., contains oversize sealed ball bearings for smoother cutting and greater power. The motor attaches quickly and easily to router base, to shaper plate, and to power plane attachment. Write today for complete Cat. 609. Stanley Electric Tools, Educational Dept., 480 Myrtle St., New Britain, Conn.



Stanley Power Plane Attachment. Spiral cutter leaves smooth, waveless surface.



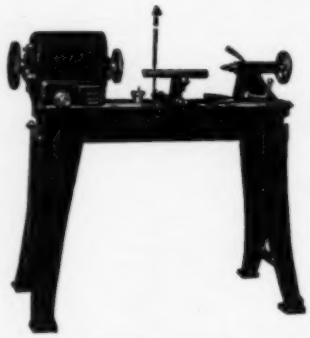
Stanley Table Shaper Plate for mounting on bench or table. Has exclusive tilting arbor feature.

STANLEY
Reg. U.S. Pat. Off.

HARDWARE • HAND TOOLS • ELECTRIC TOOLS • STEEL STRAPPING

"OLIVER" Speed Lathes

Easy operating Lathes, efficient for general shop use



Flexible performance and ample power, assuring smooth and accurate wood turning, are recognized features of "Oliver" Speed Lathes. The No. 51-A Lathe has motor-headstock with four speeds — 600, 1200, 1800, 3600 r.p.m. New type Slide Control insures easy regulation. This "Oliver" Lathe turns 24 inches between centers, swings 12 inches diameter, and has 48-inch bed. Safe and easy to run. Built to give years of satisfactory service. Extra lengths and attachments available.

OTHER "OLIVER" MACHINES FOR SCHOOL SHOPS

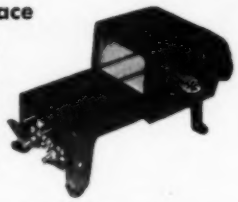
Band Saws	Jointers	Mortisers	Tool Grinders
Boring Machines	Jig Saw	Planers	Wood Trimmers
Circular Saws	Metal Spinning Lathes	Sanders	Electric Glue Pot
		Shapers	

Write for fully illustrated Bulletins

OLIVER MACHINERY COMPANY
GRAND RAPIDS 2, MICHIGAN

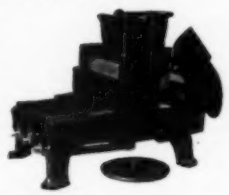
TEACH HEAT TREATING WITH *JOHNSON* FURNACES

No. 101 Bench Furnace



● Delivers up to 1800° F. without a blower. The most efficient, powerful and economical bench furnace made for heating soldering coppers up to 12 pounds per pair. Also used for heat treating, case hardening and annealing carbon steels. Two burners. Firebox 3¼ x 4½ x 5½. Complete with work rest block and baffle plate.
$17.50 F.O.B. Factory

No. 118 Combination Bench Furnace



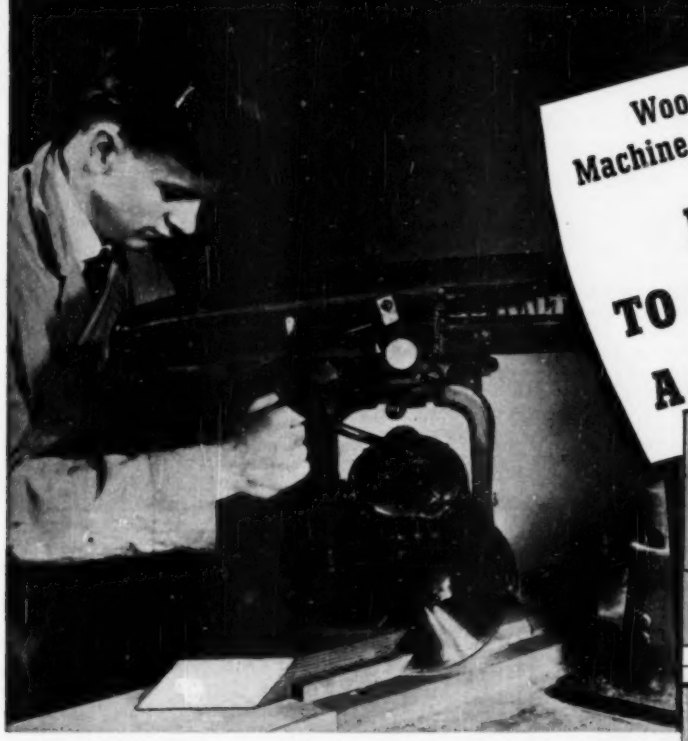
● Use this furnace for heating largest soldering coppers, stenciling irons, branding irons, etc. — for heat treating, tempering and case hardening carbon steels. And for melting soft metals such as lead, tin, babbitt, zinc, etc. A powerful two burner furnace. Lid or hood may be removed and 22 pound melting pot inserted. Firebox 6¼ x 5 x 6½.
$33.00 F.O.B. Factory

FREE CATALOG

Renew the efficiency of your present Johnson Furnace. Write for complete details on Factory Reconditioning.

Johnson Gas Appliance Co.
585 E Avenue N.W. Cedar Rapids, Iowa

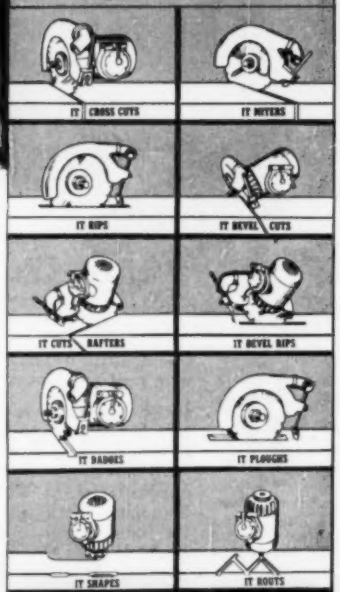
Make this a required course . . . and your wood-shop training is complete!



Wood Shop Machine Course No. 1

HOW TO OPERATE A DE WALT

DE WALT is a complete shop in itself



...and with proper tools makes any cut possible!

After the student has completed his basic training course in the use o. hand tools, he should have a required course in the operation of DeWalt.

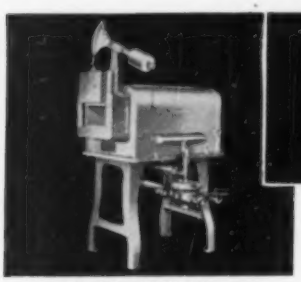
Knowing how to make the fullest use of this flexible, easy-to-operate machine, will give any student a head-start as he prepares for tomorrow's industry.

When he leaves school he will be fully acquainted with a machine that is destined to occupy a prominent place in tomorrow's industry. The perfection of the DeWalt saw has created new methods in cutting wood, making obsolete old-style equipment previously used.

Ask a nearby DeWalt dealer about two DeWalt 16MM movies—one showing the general application of DeWalt—the other showing modern, pre-cutting techniques developed during the war. Write for catalog.

DE WALT, INC.

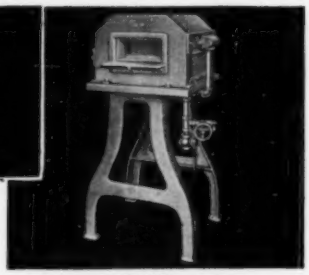
712 Fountain Avenue Lancaster, Penna.



Small Semi-Muffle Oven

Sunbeam STEWART

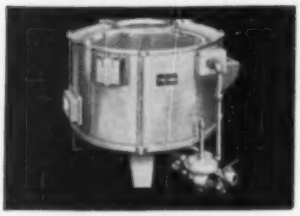
THE BEST INDUSTRIAL FURNACES MADE



Small Forge

HUNDREDS OF THESE SUNBEAM STEWART FURNACES ARE IN THE VOCATIONAL DEPARTMENTS OF TECHNICAL SCHOOLS

Because Sunbeam Stewart units have been designed for efficient production heat treating in small shops and tool rooms, they are widely recognized as standard equipment for all types of industrial heat treating and vocational training work. For student instruction and reference write for our free "Guide to Furnace Selection." Aids in determining the type of furnace best suited for any work. Also ask for the new Data File on school units.



Round Pot Furnace

Melting Furnace

SUNBEAM STEWART INDUSTRIAL FURNACE DIVISION OF SUNBEAM CORPORATION (Formerly CHICAGO FLEXIBLE SHAFT CO.)

Main Office: 4433 Ogden Ave., Dept. 114, Chicago 23, Ill.

New York Office: 322 W. 48th St., New York 19, N. Y.

Bench Oven Furnace | Triple Purpose Combination "E" | Triple Purpose Combination "D" | Dual Combination

STOP HACK SAWING DRUDGERY!

USE HAND-I-HACK*

ONE HAND CARRIES IT

The only TRULY PORTABLE Hack Saw Machine.

Hand-I-Hack is the ideal hacksaw machine for school shops. It is extremely accurate in performance. It requires little room, is moderate in first cost and operating expense.

Hand-I-Hack is very rugged and simple to understand and use. It will work in any position, and will handle practically every job encountered in a school shop. Capacity 3" x 3". Uses low-cost 10" hand blades which last 3 to 5 times longer.

INSTRUCTORS: Write today for full information. SCHOOL SHOP DEALERS: Write for our dealer proposition.

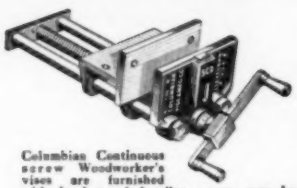
*Trade Mark Reg. U. S. Pat. Off.

Lipe-ROLLWAY CORPORATION

830 Emerson Ave. Syracuse, N. Y.

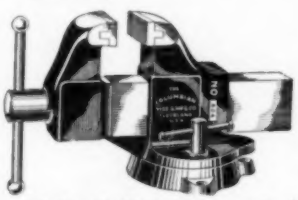
COLUMBIAN VISES

INDUSTRY'S FIRST CHOICE FOR OVER THIRTY YEARS



Columbian Continuous screw Woodworker's vises are furnished with hard wood handles — or may be equipped with ADJUSTABLE STEEL HANDLES, as above, to eliminate handle breakage, speed operation and provide extra leverage.

The complete line of Columbian Vises is designed to excel in its field — all are made to the same high standard of engineering and workmanship. A vise for every need and purpose.



Columbian Machinist's Vises are made of malleable iron castings, guaranteed unbreakable, and designed to provide accurate, dependable equipment for school and industrial shops. All standard types.

THE COLUMBIAN VISE & MFG. CO.

9022 BESSEMER AVENUE CLEVELAND, OHIO

THE WORLD'S LARGEST MAKERS OF VISES

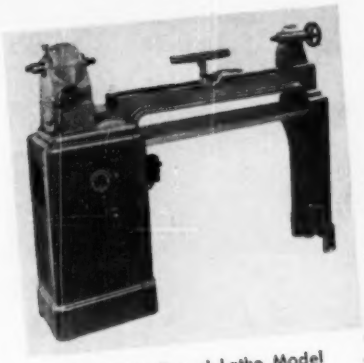
Jointer
Model P912

Patented Walker-Turner Dual Purpose Guard permits planing stock to uniform ribbon thinness with absolute safety.

YOU CAN'T TOUCH THE KNIVES ON THIS 6 INCH JOINTER

Only Walker-Turner can offer a 6" Jointer equipped with the patented Dual Purpose Guard. This unusual guard completely covers the knives at all times, making it impossible for the operator to come in contact with the blades. In addition, the guard is adjustable and can be used with any width of stock up to the capacity of the machine.

Extra long tables—37½ inches; machined dove-tailed ways for lasting accuracy; solid steel, ground and dynamically balanced, three knife cutterhead are some of the many features which make this jointer outstanding.



Variable Speed Lathe Model L1152

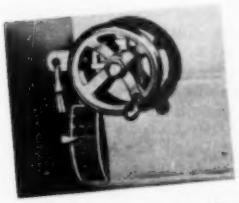
EXTRA CAPACITY VARIABLE SPEED LATHE

Because the gap bed construction has been carefully planned, you get an extra capacity of 3½ inches—and at no sacrifice of sturdiness or convenience. Swing over gap is 15½ inches; over bed is 12 inches. The distance between centers is 38 inches; from bed to floor, 36 inches.

The variable speed drive is built as an integral part of the headstock, and provides any speed from 260 rpm to 1200 rpm, and it can be locked at any desired speed.

The headstock has two sets of pre-loaded precision ball bearings with deep groove races. Headstock spindle, which is hollow, is one inch in diameter between bearings. The spindle is threaded for outboard mounting of face plate.

Tailstock bed ways are machined on top, sides and bottom left for accuracy and ease of operation. The tailstock center is automatically ejected.



Speed Control and Locking Device

walker-turner

WALKER-TURNER DIVISION
KEARNEY & TRECKER CORPORATION
PLAINFIELD, NEW JERSEY

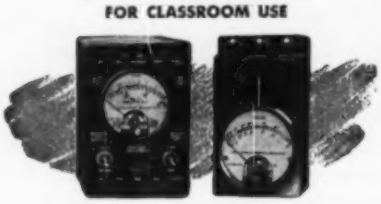
WESTON
High-Frequency Analyzer

Provides:

1. A stable, probe type, Vacuum Tube Voltmeter.
2. A high impedance electronic Volt-Ohmmeter using 115 volt, 60 cycle power.
3. A conventional Volt-Ohm-Milliammeter with self-contained power source.

Ideal for practically all electronic measurements up to 300 megacycles. Especially designed for AM, FM, and Television requirements. Completely independent of line voltage variations between 105 and 130 volts. Full details in bulletin R-31-B.

COMPACT TEST EQUIPMENT FOR CLASSROOM USE



Volt-Ohm-Milliammeter (Model 697)—Contains carefully selected group of ranges to cover a wide variety of electrical measurements. Compact, light weight, and low in cost.

Ohmmeters (Model 689)—Available in two, double range instruments . . . 0-10 and 0-1000 ohms full scale; and 0-5000 and 50,000 ohms full scale. Compact, rugged and low in cost.

WESTON *Instruments*

Write for Bulletin No. E5A describing the full line of WESTON Test Equipment . . . Weston Electrical Instrument Corp., 595 Frelinghuysen Avenue, Newark 5, N. J.

LEARNING WITH LUFKIN is a sound starting point STUDENT TOOL SETS

—bearing the famous name Lufkin inspire the student with a desirable pride and confidence in owning and working with tools accepted by skilled craftsmen everywhere as being the finest in the field.

They contain the tools selected by competent instructors as essential for most class work. All tools standard in design and quality—the same used by fine mechanics and entirely suitable for inclusion in permanent tool kits—yet the prices are within the limits of every student. Available at your distributors—or write for catalog.

SET No. 1 contains the eight tools illustrated above in stout leatherette case.

SETS No. 2 and No. 3 are somewhat similar but contain a greater variety of tools, some of a different pattern.

★ **SEND FOR THIS BOOKLET!** Send for this interesting and educational 5-color picture story book (enclose 10¢ to cover handling and mailing costs. Write Dept. AE.

THE LUFKIN RULE COMPANY
PRECISION TOOLS · TAPES · RULES
Saginaw, Michigan

Big News! **A different name for your old friends**

You will find PROTO tools—formerly Plomb tools—everywhere! Over 10,000 better-class dealers display them . . . Since 1907, high quality, superior design and long life have made them the favorites of professionals . . . Remember, the new name—PROTO tools. Buy them from your dealer today.

Write for catalog to

PLOMB TOOL COMPANY
2204N Santa Fe Ave., Los Angeles 54, Calif.

PROTO TOOLS
LOS ANGELES

4986

32 ways to TRAIN STUDENTS in VALVE RECONDITIONING!

B & D "Vibro-Centric"*, Super-Service give you BETTER RESULTS . . .

1 SUPER-SERVICE VALVE REFACERS for wet or dry grinding. Quickly grind an absolutely smooth surface and factory-accurate angle on valve faces. Grind valve stems and toppets for exact clearance.

Per STUDENT B&D VIBRO-CENTRIC Valve Seat Grinders and SUPER-SERVICE Valve Refacers will help your students learn precision work faster because they're accurate, easy to operate! Grinders require no complicated adjustments or "rigging". Refacers have streamlined, simplified controls.

Per HOUR VIBRO-CENTRIC action prevents stone loading, reduces stone wear, helps you grind each seat in a few seconds without interruptions, gets it right the first time. Valve Refacer has smooth, abundant power; super-speed feed screw; super-sensitive slides for faster work.

Per TOOL B&D Valve Reconditioning Tools give extra years of top-notch service because they are built to high precision standards with husky parts that stand up longer. Big selection of models lets you pick the *right* tool for *your* needs!

WRITE TODAY for free, detailed catalog to: The Black & Decker Mfg. Co., 680 Pennsylvania Ave., Towson 4, Md.

3 VIBRO-CENTRIC VALVE SEAT GRINDERS —Straight or 55° angle, standard or heavy-duty —put a mirror finish on any valve seat, hard or soft, in a few seconds.

LEADING DISTRIBUTORS EVERYWHERE SELL

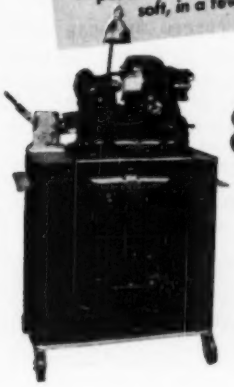
Black & Decker

PORTABLE ELECTRIC TOOLS

*Trade Mark Reg. U. S. Pat. Off.

For expert help in all SCHOOL SHOP TOOLING . . .

Call your nearby Black & Decker Distributor whenever you have a problem. And phone him for free demonstrations of over 100 Black & Decker Portable Electric Tools.



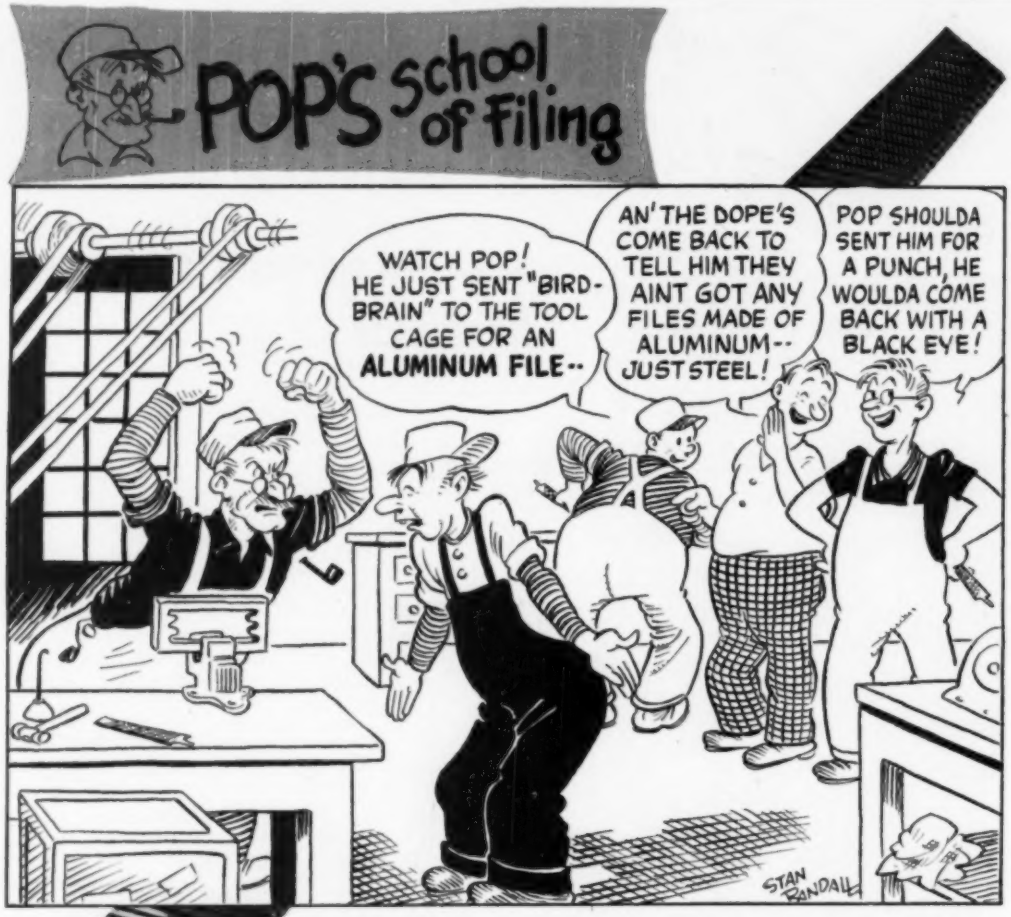
8 *Electric Valve Shops—Carry equipment to the job.*

5 *VIBRO-CENTRIC Kits for all Cars, Trucks.*

10 *VIBRO-CENTRIC Kits for all Tractors.*

2 *Stone Dressing Stands for standard, heavy-duty use.*

POP'S school of Filing


WATCH POP! HE JUST SENT "BIRD-BRAIN" TO THE TOOL CAGE FOR AN ALUMINUM FILE--
AN' THE DOPE'S COME BACK TO TELL HIM THEY AINT GOT ANY FILES MADE OF ALUMINUM-- JUST STEEL!
POP SHOULDA SENT HIM FOR A PUNCH, HE WOULDA COME BACK WITH A BLACK EYE!
STAN RANDALL

WHEN the shop greenhorn flubs one on files, Pop the foreman is sure to see red. And Pop's sure to set him straight about "the *right* file." For he knows it doesn't pay to use just any file – not when the job must be right.

Take aluminum, for example. It's soft, ductile and malleable. Clogs the teeth of ordinary files – even when moderate pressure is used.

The *right* file is the Nicholson or Black Diamond Aluminum "Type A" File. Its special teeth break up the filings, help clear the file, reduce chatter and prevent taking too large a bite. Cuts rapidly yet leaves a good finish.

HOW TO SELECT AND USE SPECIAL-PURPOSE FILES is elaborately covered in Nicholson's famous 48-page illustrated book, *"File Filosophy."* A copy for classroom and reference-library use will be sent (FREE) on individual request. Additional copies 25c each.

NICHOLSON FILE CO. • 47 ACORN STREET • PROVIDENCE 1, RHODE ISLAND
(In Canada, Port Hope, Ont.)

NICHOLSON FILES *FOR EVERY PURPOSE*

Special Features of the 1949 AVA Convention

According to the plans made for the 1949 convention at Atlantic City, each section will have a special time assignment to visit the Atlantic City educational and commercial exhibit staged at the convention hall.

One of the features of this exhibit will be a number of shop layouts in blueprint form, photographs, and scale models.

Last year's educational and commercial exhibits made quite an impression on the visitors at the AVA convention in Milwaukee — this year will no doubt be an extension of the fine work that was accomplished at Milwaukee.

It would seem that it is almost unnecessary to urge those who are interested in industrial arts and vocational education to attend this national convention. Yet, there are many who could and should be in attendance who do not go to these conventions. Still, attendance figures grow from year to year, and those who are planning to go to Atlantic City, December 6–10, 1949, can be sure that the programs will be well planned, that the exhibits will be excellent, and that the convention will be worth while in every way.

The Annual Index

The annual index has been stapled in the center of this issue so it can be removed easily when binding the 1949 issues into one volume. Government regulations require that the four pages of the index be numbered as reading pages. When the index has been removed, pages 412 and 417 will be consecutive pages.

This Month's Cover

The cover this month shows a corner of the graphic arts department of the Senior High School, Tucson, Ariz. The graphic arts department of this school has the largest enrollment of any elective subject in the school. At present it has five teachers and 346 students.

The photograph was taken by Beatrice Garcia, a student of advanced photography in the graphic arts department.

Coming Conventions

Dec. 5–6. National Association of Industrial Teacher Trainers, at Atlantic City, N. J. Secretary, Thomas Diamond, professor of vocational education, University of Michigan, Ann Arbor, Mich.

Dec. 5–6. National Association of State Directors of Vocational Education, at Atlantic City, N. J. Headquarters, Hotel Traymore. Convention chairman, J. B. Perky, A. & M. College, Stillwater, Okla.

Dec. 5–10. National Council of Local Administrators of Vocational Education and Practical Arts, in conjunction with the American Vocational Association, at Atlantic City, N. J. Headquarters, Hotel Traymore. Secretary, Dr. Albert E. Jochen, Middlesex County Vocational Schools, Easton Ave., New Brunswick, N. J.

Dec. 6. Business meeting of the American Association of Technical High Schools and Institutes, at Atlantic City, N. J., in connection with American Vocational Association convention. President, Walter J. E. Schiebel, principal, N. R. Crozier Technical High School, Dallas, Tex.

Dec. 6–10. American Vocational Association, at Atlantic City, N. J. Executive secretary, L. H. Dennis, 1010 Vermont Ave., N.W., Washington 5, D. C.

Jan. 23–27. Southwest Air Conditioning Exposition, at Dallas, Tex. Managed by International Exposition Co., with headquarters at Grand Central Palace, N. Y. Headquarters, State Fair Park, Hall of Agriculture and Poultry Building, Dallas, Tex.

VOL. 38, NO. 10 DECEMBER, 1949

Industrial Arts and Vocational Education

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

THE BRUCE PUBLISHING COMPANY
540 NO. MILWAUKEE ST., MILWAUKEE 1, WIS.

CENTRAL OFFICE: 20 N. WACKER DRIVE, CHICAGO 6, ILL.
EASTERN OFFICE: 330 WEST 42ND ST., NEW YORK 18, N.Y.

TABLE OF CONTENTS

Industrial Arts and Vocational Education in Atlantic City — *Lentz D. Gold* 389
Action Program for Secondary Schools 390
Some Leaders in Industrial Education — *William T. Bawden* 391
Let's Get Critical — *Vernon D. Stapleford* 394
A Brief Training Course for Conference Leaders — *F. Lyman Tibbitts* 396
Editorials 398
The Printing Teacher and the Graphic Arts — *David P. Barnard* 399
Supervisor's Check List for Industrial Arts and Elementary Crafts — *D. Arthur Bricker* 405
The Teacher's View on Supervision — *G. C. Henriksen* 406
English for Trade and Vocational Schools — *J. Allen Morris* 407
Associated Guilds of Teachers of Industrial Arts, New York City — *John Hurley* 409

Problems and Projects

Dog and Rabbit Book Ends — *D. C. Marshall* 412
Index 413
Jig for Measuring Taper Per Inch on the Lathe — *H. Moore* 417
Gymnasium Scoreboard — *R. Paul Lightle* 417
Plastic Door Knocker — *Chris H. Groneman* 418
Indian Silversmithing — *Ben Hunt* 419
A Modern Desk — *Carlton Redmond* 420
Sheet-Metal Layout — *Howard L. Bean* 422
The Plastic Checkerboard — *John Emmel* 423
Bow-Type Saws — *D. C. Marshall* 423
Model House — *C. V. Stainsby* 424
Wood Finishing Chart — *Fred L. Griffin* 425
Operation Units in Printing — *Maurice J. Nelson* 426
Your Attention, Please 426
The Manual Arts Press Changes Name — *Paul Van Winkle* 426

Association News 427
Personal News 16A
News Notes 20A
New Publications 24A
Shop Equipment News 29A

Entered January 2, 1914, as Second-Class Mail Matter at Milwaukee, Wis., under Act of March 3, 1879.
Copyright, 1949, by the Bruce Publishing Co.
Title registered as Trade Mark in U. S. Patent Office, November 25, 1930. Published monthly except during July and August.

Subscription Information. — Subscription price in the United States, Canada, and countries of the Pan-American Union, $3.00 per year, payable in advance. Postage, foreign countries, 50 cents. Copies not over three months old, 35 cents; more than three months, 50 cents.

Discontinuance. — Notice of discontinuance of subscription must reach the Publication Office in Milwaukee, at least fifteen days before date of expiration. Notices of changes of address should invariably include the old as well as the new address. Complaints of nonreceipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.

Editorial Contributions. — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.

Articles Indexed. — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

Good News for School Shop Budgets

AMMCO model 2600 and 1600 Combination for Wet Honing

Costs less to BUY...and Costs less to MAINTAIN

$298.50

ONE *Permanent type* HONING HEAD handles 90% of all jobs within range!

Here's a really versatile combination set-up to meet all needs for shop training in both *wet* and *dry* honing. Best of all, it's the only honing machine that can handle all sizes within its range with *only one honing head* . . . And you'll find your stone replacement cost at least 50% less. Model 1600 Coolant Unit is portable and can be used with other machines in your shop. Mail the coupon below to get full information on the economical AMMCO honing combination. We'll also send you the name of your nearest AMMCO distributor who will be glad to arrange a demonstration in your shop at no charge or obligation.

Perfect for School Shops... the AMMCO 7" SHAPER

A "precision machine of a thousand uses" . . . regular industrial model, featuring simplicity of operation, ease of set-up, precision results. Check coupon for complete details.

AMMCO

AMMCO TOOLS, INC., 2100 Commonwealth Avenue, North Chicago, Ill.

- ☐ Send information on Combination 2600-1600
- ☐ Send information on AMMCO 7" Shaper
- ☐ Send free copy of the AMMCO Tool Catalog

NAME_____

POSITION_____ SCHOOL_____

CITY_____ ZONE____ STATE_____

-IAVE-
DECEMBER . . 1949

Industrial Arts and Vocational Education in Atlantic City

LENTZ D. GOLD
Acting Superintendent of Schools
Public Schools
Atlantic City, N. J.

Atlantic City is one of America's most popular health and pleasure resorts. It is pre-eminently a convention city. There are very few industries in the area. Nevertheless an effective vocational program has been presented for the past 37 years.

In September, 1947, the ninth year of a Vocational-Technical High School was established. The tenth year was added in 1948, and the eleventh in 1949. The entire four-year program will be in operation by the fall of 1950. This new policy terminated the operation of the Boys' Vocational School, which had offered a three-year vocational course, and the two Girls' Vocational Schools, which had offered two-year courses. It eliminated the eighth-grade graduates' choice between high school and vocational school, and made a high school education available to boys and girls preparing directly for employment.

The new vocational building is still in the drafting board phase. Until it is constructed, the program is housed temporarily in three centers. The academic classes and general offices are located in the Ohio Avenue center, boys' shops and related classes at Illinois Avenue center, and girls' shops and related classes at Monterey Avenue center. Expansion of program is presently limited by existing facilities.

The Vocational-Technical High School leads to employment and is not college preparatory. Transfer is possible between the academic and vocational high schools, however, at the end of the freshman or sophomore year without loss of time or credit. In these first years, a general high school education is supplemented by four exploratory shop courses. In the final years, four periods of shop and two of related work in auto mechanics, beauty culture, carpentry, commercial cookery, dressmaking, electricity, printing, retailing, or sheet metal are offered in addition to courses in English, social studies, and health. A new course in hotel and restaurant training is being formulated.

In addition to the courses leading to a high school diploma, specialized courses in the several trades are offered to students who have completed at least two years of high school. There are courses for veterans, and apprentice training. There is a popular evening school program. For students who do not wish to work for a high school diploma and who, for economic or other reasons, wish to become employed just as soon as they reach the legal employment age, a short-term general-vocational course is offered. A course in distributive education also is offered.

The adult program offered in the evening, includes nonvocational home economics courses at the Monterey Avenue Center, courses in trade extension and apprentice training at the Illinois Avenue Center, and academic courses at the Ohio Avenue center. There also are Americanization classes for the foreign born. The entire program is limited only by physical facilities.

The Atlantic City program is chiefly

Class in printing at Vocational-Technical High School

Seventh-grade industrial-arts class at Atlantic City, N. J.

Junior High School industrial-arts class

Related science, High School, Atlantic City, N. J.

indicative of what can be accomplished in a small city with limited industrial activities and improvised vocational training facilities. It presently marks the transition from the vocational school to the vocational high school in that difficult but interesting period before the new plant is occupied. It is vocational education in the making. The world's playground is building today an adequate workshop for tomorrow.

At the seventh-and eigth-grade levels, home economics and industrial arts are required subjects for girls and boys, respectively. In the eight industrial-arts shops, general shop courses feature creative work in wood, plastic, metal, and household mechanics. In the eighth-grade home-economics laboratories, courses in the social arts, child care, foods, nutrition, and clothing are stressed.

In Atlantic City the industrial and fine arts are organized in a single department. The arts curricula at the high school offers art appreciation, illustration and design, studio art, commercial art, stage craft, arts and crafts, industrial arts, architectural drawing and three years of mechanical drawing. The high school course in industrial arts stresses industrial design and work in many media, including jewelry, ceramics, wood, metal, plastics, and household mechanics.

At the Vocational-Technical High School, the freshmen are required to study English, civics, general mathematics, science, health, drawing for boys, and art appreciation for girls, plus a double period of exploratory shop courses through each semester. The general course offered the sophomores includes English, modern history, health, and for the girls, commercial arithmetic and typewriting. The boys substitute industrial mathematics and mechanical drawing. All students are again required to have two double period exploratory shop experiences for one semester each. The specialized vocational program starts with the junior year.

Here it is that the boys and girls learn the skills that are required to maintain Atlantic City in the forefront of our nation's resorts. The maintenance of the world famous boardwalk, of yachts, beach-front hotels, ocean piers, and flashing signs; the preparation of millions of shore dinners, the entire task of keeping Atlantic City one of the world's greatest resort centers, rest in the hands of these youths. It is the job of the vocational program to prepare them for these pursuits.

ACTION PROGRAM FOR SECONDARY SCHOOLS

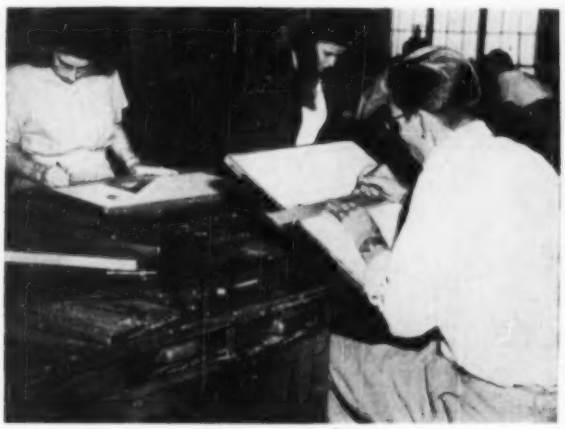
To promote an adequate program of industrial safety at the secondary school level, the following recommendations for action are proposed:

Report each accident and analyze the reasons for its happening.

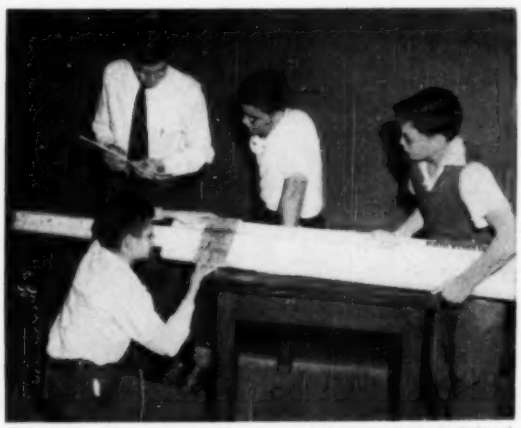
Have your school shop inspected frequently and assist in the inspection yourself.

Assist in developing a national standard school shop safety inspection check list.

Help set up local, state-wide, and national school shop safety committees.



Class in drafting



Related mathematics at Vocational-Technical High School

Some Leaders in Industrial Education

WILLIAM T. BAWDEN
Director of Publications
Kansas State Teachers College
Pittsburg, Kans.

William Elmer Roberts (Concluded)

(*Continued from page 359 of the November, 1949, issue*)

Industrial Arts in the Junior High School

The Cleveland Elementary Industrial School demonstrated the need and the possibilities of a new type of school, with curriculum, organization, and methods modified in such ways as to meet the needs of boys and girls more effectively and more completely than had been possible under the conditions of the traditional elementary school. The Elementary Industrial School paved the way, more or less directly, to the inauguration of a system of schools of a new type, the junior high school, the first three of which were opened in the fall of 1915. In time this type of organization was extended to all sections of the city.

As explained above, industrial arts as a school subject achieved a new status with the development of the junior high school, with added dignity and recognized importance. Unquestionably Mr. Roberts was in large measure responsible for this outcome, not only because of the oustanding quality of the work in the Cleveland schools under his supervision, which proved to be admirably adapted to take its place in the new organization, but also because of the effective way in which Roberts presented and discussed the underlying philosophy of industrial arts as an integral part of general education just at the time when the new plan of school organization was in process of evolution.

It is impossible in the space available to do justice to Mr. Roberts' contribution to the development of industrial arts in the junior high school, and so I limit myself to a brief statement concerning a report of a study made by him, and published by the U. S. Office of Education.[1] At the time this study was made, during the school year, 1922–23, Roberts had been supervisor in the Cleveland schools for 30 years, and had developed one of the outstanding city school programs of industrial arts in the country.

During that year he made an intensive study at firsthand of junior high schools in 13 cities, carefully selected because of noteworthy achievements in junior high school organization, in eight states. In addition, he visited a number of consolidated and township schools in rural communities. The report when published was instantly recognized as a major contribution not only to the cause of industrial arts, but also to an understanding of the organization and administration of the junior high school. The demand for the Bulletin was so great that a large edition was exhausted within the space of a few weeks. An effort was made to secure a reprint, but the lack of funds available for publication did not permit this to be done.

[1]William E. Roberts, *Manual Arts in the Junior High School*, Bulletin, 1924, No. 11. U. S. Office of Education, Washington, D. C.

Terminology

In opening the discussion Mr. Roberts began with a brief statement concerning terminology, since "it is utterly hopeless to expect to bring order out of the confusion of terms that designate hand activities in the schools or to expect the universal adoption of any term or group of terms that may be presented."

After explaining briefly his conception of the meaning of the terms, vocational education, industrial education, prevocational education, and others in common though not always discriminating use, Mr. Roberts suggested a definition of industrial arts that has been almost as influential and as widely quoted as that proposed by Dr. Bonser, which I have discussed elsewhere.

Roberts called attention to the fact that manual arts, practical arts, industrial arts, and manual training "have been variously used to mean the same thing or different things." For the purposes of this report he accepted them as practically synonymous, and suggested this definition:

"Manual arts is understood as defining hand activities given in school for general education purposes, providing life experiences within the field of industrial activities which may serve as means of concrete expression in other schoolwork, as opportunity for discovery of individual abilities and aptitudes, and as sources of information which may serve for educational guidance toward the later choice of a life career."

After devoting several pages to detailed reports of the programs observed in the cities chosen for study, the report discusses the development, functions, objectives, and organization of the junior high school; the functions, objectives, and methods of industrial arts; the basis for determining subject matter; measuring attainment in shop teaching.

Next, special sections are devoted to the subjects chosen for the recommended program: mechanical drawing, woodwork, metalwork, simple mechanics, printing. Another section deals with the preparation and qualifications of the manual-arts teacher. The report concludes with the reproduction of the floor plans of typical shops and drafting rooms, and recommended lists of equipment.

Other Publications

In addition to the Bulletin referred to in the preceding paragraphs, Mr. Roberts is author of the following:

Woodwork in the Junior High School, published by The Manual Arts Press, Peoria, Ill.

Beginning Mechanical Drawing. Same.

Beginning Woodwork Units. Same.

There were also more than 80 articles, editorials, and addresses published in professional educational journals, one of the most significant of which is probably one of his latest, "A Program for Instruction in Industrial Arts for the Junior High School," an address prepared for the annual convention of the American Vocational Association, Pittsburgh, Pa., December, 1934, and published in *Industrial Education Magazine*, March, 1935.

Before leaving the subject of his writings, I should record his services as Associate Editor of *Industrial Education Magazine*, and of its predecessor, the old *Manual Training Magazine*, over a period of 32 years, beginning with Vol. 9, No. 1, October, 1907, and lasting until the journal was discontinued in November, 1939. During this period he contributed a long series of stimulating, informative, and influential articles and editorials, dealing always in a most practical way with problems of the shop teacher, and with the meaning and functions of industrial arts in public education.

Report on Vocational Guidance

To retrace my steps once more, I wish to refer to a constructive step taken by William H. Elson, during his term as superintendent of the Cleveland schools, 1906–12, namely his suggestion to the Schoolmasters Club of Cleveland and Vicinity that a committee be appointed to make a study of vocational guidance and its meaning for the public schools. The suggestion was acted upon, and a committee of ten members was appointed late in the spring of 1912. Dr. William H. Hailmann, of the Cleveland Normal School, was named chairman of the committee. Mr. Roberts was an active and productive member of the committee, serving as chairman of one of the important subcommittees, and as a member of the editing committee responsible for the final form of the report.

Because of pressure of other duties the committee did not hold its first meeting until October 18, 1912, shortly after Mr. Elson left the Cleveland schools. This was perhaps unfortunate, for undoubtedly under the influence of Superintendent Elson's keen personal interest the report of the committee, when submitted, would have received an immediate and sympathetic hearing. As it was, the report of the committee "was three times made the order of business at meetings of the Schoolmasters Club, and twice laid on the table for later consideration through the influence of a small group of persons who were unsympathetic to the aims of those who were instrumental in sponsoring the committee and its report."

"It is a curious fact that the report of the committee was much better received and more widely known outside Cleveland than in the city and in the school system of its origin. It was pronounced by at least two of the best known experts in vocational guidance as the best statement of objectives that had appeared up to that time. The report differed from other statements in that it emphasized educational values rather than placement. It had a definite influence upon the thinking and endeavor of those who were striving to visualize and make effective industrial work in our schools."

A brief summary of the recommendations of the report will serve to show that the committee was ten years or so ahead of practice in even the more progressive city school systems of the country:

1. In the first six grades of the elementary school, in connection with current instruction, increased emphasis should be given to direct contact with things of life and to constructive manual work as indispensable factors in general culture, as stimulating motive for gathering experience, and as furnishing opportunity for productive and creative self-expression.

2. The chasm that exists between elementary and high school should be eliminated by the establishment of intermediate schools, comprising the work of seventh, eighth, and ninth grades.

3. Suitable continuation or industrial improvement schools should be established for boys and girls who leave school at the age of 14 or 15 years.

4. Teachers should be constantly on the alert, under expert direction, to discover natural abilities and tendencies at different periods in the lives of the children, and provision should be made, so far as possible, for connecting the pupil who possesses talent with the work for which he is naturally fitted.

5. There should be continuous gathering and display of material giving information about vocations.

6. There should be ample provision for expert guidance in matters of choice of vocation, and courses of study and other forms of preparation, and subsequent sympathetic follow-up of boys and girls until they reach the age of 18 years, or later if they so desire.

7. The responsibility for the organization and direction of the entire program of guidance should rest with the board of education, which represents the interests of the people as a whole.

The American Vocational Association

One important phase of Mr. Roberts' many-sided career was his contribution to the work of the American Vocational Association and its predecessors. He attended the annual conventions regularly, served from time to time on important committees, and was a frequent participant in the programs. For the purposes of this sketch I limit myself to a brief account of his service as the first chairman of what later became the Industrial Arts Section of the Association, and his membership on the Committee on Standards of Attainment in Industrial-Arts Teaching.

The story of the American Vocational Association, and of its predecessors, would be one of the major chronicles of the history of education during the first half of the twentieth century. The National Society for the Promotion of Industrial Education was active from 1906 to 1917, at which date it was succeeded by the National Society for Vocational Education, which was active from 1918 to 1925. The Vocational Education Association of the Middle West was organized in 1915 and continued until 1925.

The story of the activities and the achievements of these associations is indispensable to an understanding, not only of the place of industrial arts in public education, and of the evolution of the vocational education movement, but also of other important phases of education supported at public expense. It is a story much too complicated, and too extensive in its ramifications, to be undertaken here, and yet a few background facts are essential at this point.

The old National Society for the Promotion of Industrial Education, as previously noted, held its first convention in Chicago, in January, 1908. The next seven annual meetings were held in Atlanta, Milwaukee, Boston, Cincinnati, Philadelphia, Grand Rapids, and Richmond (Virginia) — the last mentioned in December, 1914. During this period a strong sentiment of protest developed in the section roughly described as the middle west, with reference to the policies and program of the society, mainly on three counts:

1. That the society was financed and controlled by eastern men, who were making little if any progress in the direction of a truly "national" organization.

2. That the eastern leaders seemed ignorant of and indifferent to "some questions that were considered vital to the interests of public education in the middle west."

3. That certain eastern leaders were not hospitable to the interests of manual training (now industrial arts), but were harshly critical and even scornful of its educational values, and disposed to eliminate it entirely from the schools.

By contrast with this attitude toward industrial arts on the part of many influential leaders in the east, it was much more common to find in the middle west the conviction that the quickest, most economical, and most efficient way to develop a program of vocational education is to build it on a foundation of strong courses in industrial arts, home economics, commercial subjects,

and other practical activities in the elementary and high schools.

In later years the eastern leaders were forced by the lessons of experience to acknowledge the contribution to vocational education made by well-organized programs of industrial arts, and their attitude became somewhat more cordial. But there never has been any adequate public explanation for the obstinacy with which the initial determination to eliminate all manual training from the schools in favor of "honest-to-god" vocational education was adhered to for so long.

The leaders among those who became convinced that there was need for an organization that would serve more effectively the interests of the central region were: William J. Bogan, then principal of the Lane Technical High School, Chicago; Albert G. Bauersfeld, supervisor of industrial arts in the high schools, Chicago; William Bachrach, supervisor of commercial education in the Chicago public schools; and Wilson H. Henderson, Extension Division, University of Wisconsin, Madison. The preliminary correspondence quickly confirmed the belief, several planning conferences were held, strong committees were appointed, and the call went out.

The first meeting of the new association was held in Chicago, in February, 1915, with an attendance of over 600 persons. The name adopted was the Vocational Education Association of the Middle West. Eleven annual meetings were held, six of them in Chicago; three were joint meetings with the eastern association, the last of which was held in Des Moines, Iowa, in December, 1925. At this meeting plans were matured for a merger, after two or three years of intensive committee work, and the newly organized American Vocational Association held its first meeting the following year, December, 1926, in Louisville, Ky.

In the meantime, very largely through the aggressive campaigning of the old National Society, the Smith-Hughes Federal Vocational Education Law was enacted, in February, 1917. It then became apparent that a change in name of the National Society for the Promotion of Industrial Education was in order. Not only had the major goal been attained which the society had set for itself, but changes in concepts and policies called for a broader title. The society therefore changed its name to the National Society for Vocational Education, and held its next convention in Philadelphia, in February, 1918.

Demand for Recognition of Industrial Arts

In the conferences and discussions that preceded the adoption of the constitution of the new American Vocational Association, strong efforts were made to secure recognition of industrial arts as one of the major constituent sections, but without success. At Louisville, in December, 1926, Dr. Edwin A. Lee, then professor of industrial education in the University of California, Berkeley, was re-elected president, to serve at the next convention, which was to be held in Los Angeles. Before leaving Louisville, an informal committee of industrial-arts leaders called on Dr. Lee to urge him to take some step that would assure the industrial-arts forces of the country of an appropriate place in the new Association.

Dr. Lee's response to this request, announced some time later, was the appointment of William E. Roberts as chairman of a program committee, with instructions to prepare three strong programs of special interest to supervisors and teachers of industrial arts for the Los Angeles convention, December, 1927. This was one of the seven conventions which I did not attend, out of the 51 conventions of the four Associations, to date, consequently I am not able to report the Los Angeles meeting from personal observation.

There is ample evidence, however, that Mr. Roberts did an outstanding piece of work in selecting the speakers and arranging the programs. It was reported that the programs of the industrial-arts meetings attracted audiences of over 400 teachers, more than double the size of any other session except the general sessions and the annual banquet. The high professional quality of the programs and of the open discussions, and the interest and enthusiasm displayed exceeded the attainments of all other sections of the convention, and administered something of a shock to certain individuals who had been inclined to belittle the significance and the vitality of the industrial-arts movement.

The significance of Mr. Roberts' achievement is seen in that the interest which he aroused at the Los Angeles convention and which he intensified in the programs of the convention of the following year at Philadelphia, led directly to an organized effort to secure more adequate recognition. This effort culminated in an amendment to the constitution, the creation of the office of vice-president for industrial arts, correlative with those of the other major sections, and the appointment, in 1933, of the late Professor Robert W. Selvidge, of the University of Missouri, as the first to occupy this office.

The Committee on Standards

Growing directly out of the events just related is the service rendered by Mr. Roberts on one of the important committees of the American Vocational Association. The chairman in charge of the program at one session of the Los Angeles convention was Emanuel E. Ericson, head of the department of industrial education at Santa Barbara State College, Santa Barbara, Calif. At this meeting he presented and led the discussion of the report of a committee which had made an original study of "Standards of Attainment in Industrial-Arts Teaching."

The discussion at this meeting seemed so timely and suggestive that a petition was addressed to the executive committee of the Association, requesting the appointment of a committee to continue the study and to report at the next meeting. The executive committee acted favorably on the request, and the Committee on Standards of Attainment was appointed in March, 1928, by Robert L. Cooley, then president of the Association. The first chairman of the committee was Professor Ericson, who was responsible for initiating the study.

Mr. Roberts was an active member of the committee from the beginning, and was influential in helping to steer the project along practical and fruitful lines, and in keeping it from becoming just another excursion in "educational and statistical research." At every stage of the study, Roberts made it a point to subject the tentative findings, conclusions, and recommendations to a thorough workout in the industrial-arts shops of the Cleveland schools. His reports to the committee contributed materially to the progress of the study and to the soundness of the results.

Mr. Roberts served as chairman of the committee from September, 1932, to September, 1936, the critical period which saw the completion of the Sixth and Final Report of the Committee, submitted at the annual convention of the Association in Pittsburgh, Pa., December 7, 1934. He is still a member of the committee, and contributed significantly to the preparation of the "Revised Report," entitled, *Improving Instruction in Industrial Arts*, which was published by the Association, June 15, 1946, and submitted at the 40th annual convention of the Association in St. Louis, December, 1946.

The Manual Arts Conference

I bring this sketch to a close with a brief reference to Mr. Roberts' contributions as a member of the Manual Arts Conference of the Mississippi Valley, an informal organization of heads of departments of industrial education in colleges, universities, and other teacher training institutions. In December, 1947,

the members voted to change the name to the Industrial Arts Conference, but Roberts knew it under the old name.

Mr. Roberts was voted an active member of the Conference in 1914, because of his activity in the preparation of teachers of industrial arts in the Cleveland Normal School and in the College of Education of Western Reserve University. He also served, before that date and later, as guest instructor in the summer sessions at Teachers College, Columbia University, New York; at the University of Illinois; at the University of Chicago; at Bradley Polytechnic Institute, now Bradley University, Peoria, Ill.; and at the University of Washington, Seattle, Wash.

Mr. Roberts has spoken frequently of the inspiration derived from the meetings, programs, and associations of the Conference. At the twentieth anniversary meeting, held in Peoria, Ill., December, 1929, in contributing to a symposium on "What the Conference Has Contributed to the Development of My Department," he said:

"The development of our work in Cleveland, so far as I have had any influence upon it, during the 15 years I have been a member of this Conference, has been due directly to my reactions to the things that I have gotten from this Conference." And elsewhere, on another occasion, he said: "Among the influences making for progress in my professional career, I would place first the annual meetings of the Mississippi Valley Conference during the years that I was a member, 1914–32. Cleveland in a sense became a laboratory for testing the findings and the recommendations coming out of the round-table discussions at the Conference table, and out of the innumerable individual discussions with members who were interested in the same things I was."

The other side of this picture is that Roberts made a notable contribution to these discussions, on several occasions distributing to members in attendance voluminous collections of outlines of courses of instruction, instruction sheets, working drawings and designs of projects, and other valuable teaching aids developed by committees of teachers in the Cleveland schools under his leadership.

On many occasions Roberts' critical comments on programs and proposals coming from the teacher training institutions, as he described their actual working out "under fire" in the Cleveland schools, pointed the way to modifications, improvements, and the elimination of unworkable features.

In conclusion, the professional career of William E. Roberts is one of the best illustrations I know of the advantages of staying in one place over a period of years, "growing personally with his rapidly expanding program," experiencing the success which crowned his efforts in such generous measure, and enjoying the satisfaction of seeing many of his dreams come true.

References

In addition to other sources I have made particular use of the following references:

Fifty-Eighth Annual Report of the Board of Education, Public Schools of Cleveland, Ohio, for the School Year Ended August 31, 1894.

Several issues of *Industrial Arts Shop Notes*, official publication of the Cleveland Industrial Arts Club.

William H. Hailmann, *The Elementary Industrial School*. A report submitted to the Cleveland board of education, with analysis of plans, course of study, and summary of results. Published by the Board of Education, Cleveland, Ohio, 1910.

Report of the Committee on Vocational Guidance, Dr. William H. Hailmann, chairman. The Schoolmasters Club of Cleveland and Vicinity, April 12, 1913.

Several annual reports of William E. Roberts, supervisor of industrial arts, Public Schools, Cleveland, Ohio.

William E. Roberts, *Manual Arts in the Junior High School*. Bulletin, 1924, No. 11, U. S. Office of Education, Washington, D. C.

William E. Roberts, *Woodwork in the Junior High School*. Published by The Manual Arts Press, Peoria, Ill., 1930.

Unpublished papers and addresses by William E. Roberts, also articles and editorials contributed to educational journals.

Charles A. Bennett, *History of Manual and Industrial Education, 1870 to 1917*, Chapter 10. Published by The Manual Arts Press, Peoria, Ill., 1937.

Let's Get Critical

VERNON D. STAPLEFORD
Bassett Junior High School
New Haven, Conn.

For the good of our industrial-arts programs it is essential that the teachers handle their jobs in a manner befitting the importance of the position they hold.

It can be assumed that most instructors are doing just that, yet we all know that many teachers do not reach their maximum capabilities until many years of experience have been accumulated. Every teacher goes through the period of trial and error until he arrives at methods that fit his personality. This means that we are not doing the job as well during the first few years, and of course someone has to suffer for this lack of experience. Generally the instructor is affected nearly as much as the student. How wonderful it would be if a new instructor fresh from college could start his first job with the confidence and ability that the experienced man usually possesses.

In order that new teachers as well as old may benefit from the past year of work let us analyze the results of this last year. All instructors should do this to help find the answers to the many problems that arise and to assure themselves that they are not going to get into the uninteresting "rut." Every teacher can improve in one way or another.

Shop Arrangement

As teachers we must plan and organize our shops so that the children will receive as superior instruction in our individual fields as conditions and equipment will allow. With the future of industrial arts in mind we must not forget that the children we now have in our shops will soon be the public which supports our programs. The impressions and attitudes they acquire under our direction will carry into later years.

One of the most discouraging things that can happen to a teacher is to spend many hours instructing a group and later give a test in the materials covered only to find that many failures or near failures exist. How can we prevent this from happening to future classes? Were the failures due to the inability of the students to absorb the information? In most cases this is not the cause of poor marks. It may be that we cover the work too fast or the use of constant review is not explored sufficiently. Perhaps the presentation was uninteresting to the student and attention lagged during the class. What many of us fail to realize is that we are teaching complicated processes. To the instructor the material may be old, but to the beginning boy they are immensely involved. We should not expect him to retain all the information the first time it is presented. How often do *we* get everything the first time without some repetition? Frequent reviews are necessary and here intelligent use of pictorial material and models can help the boy to understand the information. Are we using enough moving pictures in our classwork? Have we tried to make use of large models of tools as much as possible? A large wooden model attracts real interest and will cast a permanent image on the boy's mind where an oral lecture would only glance off.

Teaching the Student to Think

Boys should learn to *think*, but how many of us allow them to do it? Is it easier to keep repeating information long after it should be part of their knowledge rather than try to find out why repetition is necessary? Do our boys have to come up to us for each step in the construction of their project in order that they can do the work? If a boy has built a certain project under supervision isn't it reasonable to expect him to go ahead and build another just like it without needing our guidance all through it again? If this is happening to us it is proof that we are slipping somewhere and that little actual thinking is being done by the student. Most of it is done by the teacher with the result that the worker is developing very sluggish mental habits.

Is there anything that we can do about this real problem of thinking? Surely there is some answer. It may be that we have not trained them to reason things out in their early experiences in the shop. Would the use of planning sheets help overcome this with the instructor being certain that even the boys new to the work could plan and think through the steps in the construction? It cannot be expected that the beginner will be able to think out in advance the exact tools to use and the logical steps in the construction, but the teacher can do it with him. If this work is done before the whole class the boys can help develop it under guidance. With this work planned out and written down in good order the boy can work from this sheet which will stimulate his thinking. Would such a method help to avoid wasted material and effort? Have we had a boy become discouraged with a project because he did an operation too soon and spoiled the looks of the entire job? Doesn't it seem logical that the planning of work will relieve the instructor of a great deal of detail work and allow more time for supervision of the actual operations?

Helping the Beginning Student

It may not be necessary to plan the entire project at one time, especially with advanced students or even with beginners, but each new part should be carefully planned in advance. A boy will soon find out that he will be at a standstill unless he actually does some thinking and this will be stimulating.

Planning a project does not mean that a boy has to make a complete drawing of it. That would be expecting too much of a student with no drawing experience and would lead to discouragement before he even started. There seems no reason why he should need to make his own drawing so long as he has one that he can follow. Individual parts can be laid out and planned where it is necessary to have a pattern, but not the entire drawing.

When the problem of planning comes up there at once arises the thought as to how one instructor can sit down with a large group of boys and supervise the plans without causing confusion and dissatisfaction on the part of the boys. We all know that idle hands breed trouble. Of course this might be overcome by having all the boys plan and build the same project. This may not be a satisfactory answer, especially for advanced boys. It may be possible to have groups of boys make the same project. If individual projects are made, plan only one part at a time and start the boys on that part as soon as possible. Later the varying speeds of the boys will give time to supervise the planning of additional steps.

Do we select projects for our beginners that show we have a real understanding of the desires of young boys with a view to developing as much interest and enthusiasm as possible, or do we make the same uninteresting things year in and year out? Can we expect real interest and good workmanship on outdated projects? After all, if a student's brothers built the same pieces for years back we cannot expect the boys to be enthusiastic and properly adjusted to the work ahead. Could this possibly be the cause of lagging interest and some of our disciplinary trouble? Wouldn't it be more profitable for both the instructor and the student to start each year with the development of a new idea. Remember we are trying to keep out of that "rut." Of course such new projects should be planned around the tool processes to be covered in a particular grade, and each new project would be better if it were progressive in difficulty. Did we ever spend half a year making a sandpaper block? We should not forget that usually the first year classes show more honest-to-goodness enthusiasm than any other year so we must be careful not to destroy it at the start.

Is it possible that our classes are *chip* making classes? Are we developing an attitude in our students that written or oral discussion is wasted time? Wouldn't it be better to take a reasonable length of time at the beginning of each class for the presentation of technical and related information rather than hope that we can impart it to each individual as he is working on his project? We all know that advanced projects vary too much to adequately cover all the information that should be given when no or little group instruction is done. This settling down period is really needed, and the time spent in this manner helps to keep up the interest by not allowing the student to develop the attitude that the whole program is merely a game. He must be brought to realize that there really is something to learn. It will tend to prevent the boys from growing restless toward the end of the period because of overemphasis on handwork.

Let us hope that none of us are guilty of forgetting all about the needs and desires of our students while we are working during class periods on material entirely unrelated to the work being done by the students. Could this be a cause for waning interest? Certainly if we are not interested enough in the project being built to pay attention to it, we cannot expect the boys to do differently.

Many of us feel that the only way to keep tools in good condition is to keep them in a cage under lock and key with tool checkers wasting many hours there as well as much time being lost by boys waiting to sign out for tools. How many of us have really placed the tools within easy reach of the workers and attempted to devise a system of checking so that the cage could be done away with? Are we really developing pride in our tools and in the shop by advancing the impression that

everything has to be locked up to keep it safe? Do our boys like good tools and sharp ones or do we allow the equipment to get into such a condition that there is no incentive for taking good care of it. We all agree that valuable tools cannot be spread out in front of average boys without having them carefully checked. It would be indeed looking for trouble, but proper supervision could be the answer. Are our toolholders so constructed that we can tell at a glance if anything is missing, or are the tools arranged in a makeshift manner.

Do we have trouble with boys because we have permitted them to become overfamiliar? Of course there are teachers that can get away with this sort of thing but aren't they the exception? How many times have beginning teachers started off by being so-called *good fellows* only to end up having trouble with boys going too far? One should not be unfriendly, yet a certain reserve should be maintained. Dignity and sincere concern for the students will never be mistaken for weakness. A class without discipline is very hard to instruct.

Can it be possible that teachers can see too much, or is it advisable to overlook some of the minor things that any normal boy would do, things which are not of the type that will grow into serious misbehavior? Maybe it would be well to sift out incidents that can breed trouble from those other harmless ones. Have we tried a laugh and a smile once in a while to see what the results would be on the general morale of the class? We must never forget that none of us are perfect. Are we careful never to be unfair to the student? Too many of us do not allow sufficient time to properly weigh both sides of a questionable incident, and discipline first and question later. This lowers the respect of the student for us and quite rightly so. No person wants to be accused of something that he did not do, and our students feel the same way about it. Do these aggravations ever cause us to use threats that we cannot carry out? A threat that is not carried out harms our discipline and lowers us in the minds of the boys, and tempts them to continue to misbehave again in the future.

Are we always careful to present a neat personal appearance in our classes, or do our shop coats need washing? Is this same carelessness reflected in the appearance of the shop? Good housekeeping can be a real aid in teaching. How can we expect neatness from the students if we are not neat ourselves? Does the cluttered up condition of our shop invite accidents? Shops in which poor housekeeping conditions prevail, usually also show that an inferior quality of teaching is being done. Good teaching and an orderly, well-organized, neat shop, with good tool, material, and project storage facilities cannot be separated if success is to be expected.

Surely not the least important item to be studied in looking back over this last year is the course of study being used. Is our work definitely planned out with each year's work fitted to the age level of the students? Do we know exactly how much information, both technical and related is to be presented and do we really cover it? A poor background of information in the seventh grade will seriously handicap the boy in the ninth. Here again is where the *chip* making type of instructor will run into difficulty and his negligence will be directly related to the quality of work done by the advanced boy. Absolutely no one can gain by such methods of instruction and even though the instructor may feel he is getting out of something at the beginning it only means he will have to work twice as hard to adjust the boy later; and the boy probably never will catch up.

A Brief Training Course For Conference Leaders

F. LYMAN TIBBITTS
Vocational Adviser, Veterans Administration
Los Angeles, Calif.

(Continued from page 310 of the October, 1949, issue)

SESSION III

Organizing Data

I. Cutting out unnecessary facts or data.
   a) Go over all facts on record.
   b) Check for value of facts.
II. Rearrange facts in logical order.
III. Balance of period given to practice on getting facts.
   a) 10 minutes per person.

Organizing Facts or Data

After the meeting has been planned, or the stage set, the next step is getting the facts. This was taken up in Session II. It should also be remembered that the most useful facts come from the group. It is assumed, in conference problem solving, that the combined experiences of the group are sufficient to furnish the necessary facts for the solution of most institutional problems. The primary concern in this instance is how to get these facts drawn out of the individual members of the group, and the pooling of these facts or experiences so that they furnish the background out of which the solution of a given problem will arise. Obviously, no single individual will have as much experience or know as much as the whole combined experience of many years more than that of the most experienced individual in the group. It is this combined experience that the leader should draw upon and organize. Thus, the next step in conference problem solving is that of organizing the facts or experiences that have been drawn out of the group. There will be many facts brought out which have little, if any, definite bearing on the problem at hand. These must, of necessity, be thrown out before the facts are organized for use.

Two suggestions are offered here for this preliminary action:

1. Go over all facts on record, and read them over together.
2. Check the value of each item or fact in relation to the problem as it is seen at the time.

All facts should be checked to determine their importance in the light of the whole problem. After they are all checked, there should be a fairly general agreement on the question of selective value before discarding them.

When the irrelevant facts have been taken out, the remaining ones should be organized. This involves the separation of facts — putting together those that show

advantage in one group, and those that show a disadvantage in another group.

Each of these groups of facts should be put in logical order, if possible, before any tentative conclusion is drawn.

The following will illustrate this point:

The problem before us is this — Should women be used as supervisors in the factory? This is a problem that is being faced at this time, or will be, in the very near future. The aim might be stated as follows, particularly at this stage: To discover whether or not it would be wise to use women as supervisors in the factory.

Let's take a look at the facts that have been brought out in a previous session in the order of their presentation by members of the group.

1. Women do not know enough about mechanics to be supervisors.
2. Neither men nor women like to be supervised by women.
3. Women do not have enough force to get a job done well by ordinary workingmen.
4. You have to be rough to get work done in the factory.
5. Women are not physically fit for supervisory work.
6. Women cannot learn complicated mechanics.
7. Women personalize things too much to be good supervisors.
8. Women are too jealous by nature to be fair with individuals.
9. Women are too reluctant to make decisions.
10. Women have a natural fear of and lack of interest in machines.
11. Women are too independent to get along well with others.
12. Women are too temperamental.
13. There is too much prejudice to overcome.
14. Women cannot stand the strain. They get too nervous.
15. Women are available. Men are not.
16. Women have proved to be good supervisors in offices, schools, and some factories.
17. Women have been able to learn mechanics.
18. Women have proved successful in some supervisory jobs in factories.
19. Women are good teachers.

Now let's look at these facts or supposed facts again to see whether or not they have any value in the light of the proposed job.

Facts that do not appear to have any value in relation to the proposed job are: (Check these off — mark with a *C* those things that might be corrected by training, and with an *O* those things that are mere opinion, not supported by present known facts.)

Omit statements which are marked opinion *O*. The other facts appear valuable enough to use directly as a basis for the solution of this problem. Now let's arrange these facts for further study. We shall include those which might be corrected by training. They now are:

1. Women are available for supervisory jobs.
2. Women have shown ability to learn mechanics.
3. Women have proved themselves good supervisors in offices, schools, department stores, etc.
4. Women have proved successful supervisors in some factories.
5. Women are willing and co-operative workers.
6. Women are good teachers.
7. Women do understand human nature.

Some disadvantages of women supervisors that may be corrected by training and experience:

1. Women do not know enough about mechanics to be supervisors.
2. Women have a natural fear of and lack of interest in machines.
3. Not physically fit or strong enough.
4. Cannot learn complicated mechanical activities.
5. Women personalize things too much.
6. Women are too jealous by nature.
7. Women are too reluctant to make decisions.

If then these facts are matched with the requirements of the job, some solution might be effected. Let's take an analysis of a supervisory job as outlined by Vernon J. Swanson in the magazine, *Supervision*.

What facts indicate that any of these cannot be done? Check the ones and state the fact.

Supervisory Job

I. Training and development of employees.
   a) Teach new and inexperienced persons to do a job.
   b) Develop workers to their maximum difficulty level.
   c) Teaching good work habits.
II. Human relations right on the job.
   a) Inspire the worker.
   b) Understand problems of human motivation.
   c) Handle complaints from grievances.
   d) Forming attitudes.
III. Methods improvement.
   1. Eliminate, combine, rearrange, or simplify job methods.
      a) To save time, material, money.
      b) To reduce waste in any form.
   2. Personal betterment.

After checking the known facts against the job, one might draw a satisfactory conclusion. That will be the purpose of the next session.

We shall now spend the remainder of the period on supervised practice on getting the facts or data.

(*To be continued*)

Aviation mechanics training at the Chicago Vocational School

Industrial Arts and Vocational Education
John J. Metz, Editor

A SEASONAL PROJECT

The Christmas Season is approaching rapidly. The school shop is a fine place to engender the Christmas spirit, because many things can be made there which will cause gladness to young and old.

One of the finest projects for the general shop at this time of the year is the collecting of children's old toys, repairing those that need it, and repainting them carefully. The distribution to orphanages and children's hospitals will not only give much joy to those who receive these gifts, but also to the boys who worked on the project of revamping them, and on distributing them to children who might otherwise have little joy on Christmas.

THE AVA CONVENTION AT ATLANTIC CITY

The city chosen for the 1949 annual convention of the American Vocational Association is often called America's Convention City. It is practically a year-round seaside resort which has many attractions for the visitor who is looking for relaxation and pleasure, as well as for those who want to meet for discussions of various problems of which there are so many today.

The American Vocational Association convention will be held December 6–10, 1949. For its success, of course, it will be necessary that there is a good attendance of those interested in industrial arts and vocational education.

Conventions are only as good as those who attend make them. This is a general statement, of course, but the success of any meeting requires not only careful planning by a few, but also the thoughtful discussion by the many who attend.

For many of the visitors, this will be the first time that they are at Atlantic City. They will find this community quite interesting because it is so different from the usual convention places commonly chosen. Although there are practically no industrial establishments in Atlantic City, there is much work of a trade nature required to maintain the large hotels, amusement and eating places that are needed to house and entertain the large numbers of people who visit that city every year. Because of the need to train the youth of Atlantic City in the work that is required to keep that community in an attractive and safe condition, the city has an industrial arts and vocational education setup in its schools, that is well worth consideration.

Besides this, the state of New Jersey offers splendid opportunities for observing excellent vocational school programs. New Jersey is an industrial state that realizes how necessary it is to educate its youth so they can take the place of the designers, toolmakers, patternmakers, machinists, building tradesmen, and the like, who, because of age, sickness, or industrial accidents, are ready and anxious to place their burdens onto the shoulders of younger men.

Since there is excellent bus and train service from New York City to Atlantic City, visitors will also have a chance to go and inspect the school system of that large city.

The past year has been very successful in the fields of industrial arts and vocational education; hence, there is every reason to expect this year's AVA convention to be equally successful. The program for the annual meeting has been very carefully planned, and it is now up to the membership to do their part in making the 1949 AVA convention the success it deserves to be.

LOOKING FORWARD

Approximately two thirds of the first semester of the school year 1949–50 is over. The time has come, therefore, to check up what has been accomplished with this year's crop of students. It is possible that you were lucky and got classes of outstanding students. If so, are you taking full advantage of your opportunities with these gifted youngsters? Or, are you just following the regular course that you had set up for the average run of pupils?

It is not too late even yet, to so change your outline that both you and your students will get much more out of your course. Just what changes ought to be made, depends upon circumstances. Probably a number of more difficult and more complex projects would answer, or a more expanded series of related subject materials may be taken up, or some technical facts may be discussed so that the students gain as much as possible from your course. Above all, indoctrinate these boys with the need for observing the rules of safety in their work. The bright students in your classes, no doubt, will be the leaders in industry and commerce in the future. Their knowledge of safety pratices may be instrumental in saving the lives of many others.

Whether you are fortunate enough to have such a class or classes of especially bright students or not, scrutinize your course and see whether it cannot be made of greater help to all of your classes. Do it now rather than wait for the end of the semester. Let your present crop of hopefuls profit from the earnest study of what you have accomplished so far this year.

Volume 38 of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The December, 1949, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION completes Volume 38. Looking at the annual index, pages 413, 414, 415, and 416 of this issue shows that 208 authors contributed to this year's wealth of professional material, presented to the reading public in our field.

The volume just completed contains a total of 428 pages of professional reading matter. This, in terms of pages for a six by nine-inch book, which is the size chosen for many texts, would mean approximately 1070 such pages. In other words, what was published in the 1949 volume of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION is equivalent to four or five good size textbooks.

The articles, too, cover a wide variety of subject matter on various levels, and there is material to be found which is suitable for the elementary grades, the junior and senior high schools, the full-time and part-time vocational schools, and the adult education classes.

The index for Volume 38 may be found on pages 413 to 416 inclusive. It has been stitched into the center of the magazine so that it may be removed easily by those who bind the ten issues into an annual volume.

The Printing Teacher and the Graphic Arts*

DAVID P. BARNARD
Instructor of Graphic Arts
The Stout Institute
Menomonie, Wis.

Teachers are all interested in the opinions of other instructors concerning the subject matter that should be taught in the graphic-arts field. Assuming that the individual teacher determines to a large extent what is taught in secondary schools (especially in the smaller school systems), an evaluation of objectives and subject matter content by typical instructors throughout the nation, teaching printing or other areas of work in the reproductive division of graphic arts, should give a representative picture of what we may expect will be taught in the secondary schools in the immediate and near future. From this standpoint the opinion of the teachers in the field is significant. The writer had this in mind when he surveyed the opinions of 164 printing instructors in 29 states and the District of Columbia.

The survey, which was conducted in the spring of 1947, is concerned with the evaluation and relative importance of (1) specific objectives, and (2) areas of work in the reproductive division of graphic arts. Secondary outcomes of the survey were to determine to what extent the various areas of work are being taught in representative secondary schools in the United States, what reasons are cited for not including a wider range of areas, and to what extent departments other than industrial arts are offering activity units in the reproductive and related areas.

*The results of a national survey on the relative importance of the various areas of work in the graphic arts, as reflected by the opinions of 164 printing instructors in 29 states.

Letterpress Printing — Graphic Arts

There has been a definite trend during the past several years for educators and leaders in the graphic-arts field to include more than the conventional letterpress printing in courses offered in the industrial-arts curriculum of the secondary schools. These opinions have been expressed in periodical literature, public statements by leaders in industrial education, and in theses written in the various graduate schools in the nation. That this trend in opinion by the educators and leaders was not supported by the instructors teaching in the field is evidenced by the investigations of Harris,[1] MacLeod,[2] Wagner,[3] Lamb,[4] Oakland,[5] Milburn,[6] Sturm,[7] Sissel,[8] and Bilsey.[9] These studies have indicated that letterpress printing was, with but few exceptions, all that was

[1]D. W. Harris, "A Study Treating Some Phases of Curriculum and Method in the Field of Printing and the Related Graphic Arts Divisions," Unpublished Master's Thesis, Miami University, 1931.

[2]R. Bruce MacLeod, "Printing Equipment in the Secondary School," Unpublished Master's Thesis, Colorado State Teachers' College, 1932.

[3]Merlin R. Wagner, "A Course of Study in Printing for the Public Schools," Unpublished Master's Thesis, Oregon State Agricultural College, 1933.

[4]Clarence A. Lamb, "A Course of Study in Printing and Related Subjects for Continuation-school Classes," Unpublished Master's Thesis, University of Southern California, 1932.

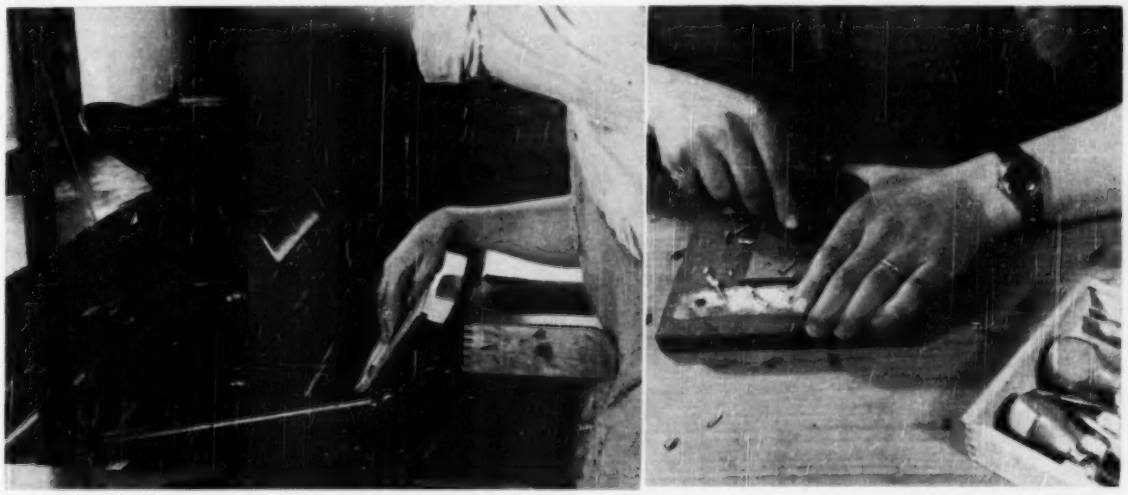
[5]Milo T. Oakland, "A Study of Graphic Arts Content with Special Reference to Printing," Unpublished Master's Thesis, The Ohio State University, 1935.

[6]James L. Milburn, "A Survey of Industrial Arts Printing in the United States," Unpublished Master's Thesis, Indiana State Teacher's College, 1937.

[7]Raymond W. Sturm, "Graphic Arts Activities in the Industrial Arts Curriculum," Unpublished Master's Thesis, The Stout Institute, 1939.

[8]Forrest Dale Sissel, "Analysis of Related Information on Printing for Students of Industrial Education," Unpublished Master's Thesis, Iowa State College, 1941.

[9]George Joseph Bilsey, "Content Affecting the Development of a Graphic Arts Laboratory," Unpublished Master's Thesis, The Ohio State University, 1944.



Left — The letterpress: Feeding the hand-lever press. The hand-lever press is used instead of power equipment to keep the scope of the process elementary and basic, and to lower the cost of equipment. Right — Block printing: Cutting the linoleum block. A bench hook is used to hold the block. Linoleum is easy to cut, and the cutting tools are relatively inexpensive. In the interests of safety our model should remove his left hand from in front of the gouge

taught prior to the time that each study was conducted.

Oakland[10] made the initial analysis in the educational field of the processes included in graphic-arts. In order to validate his analysis he submitted it to a board of experts in the field for constructive comment and criticism. After obtaining this, he revised his analysis in accordance with the criticism received. Sturm[11] used Oakland's findings in making a graphic analysis of the field. He selected representative content from this analysis suitable for secondary school industrial-arts programs on the basis of frequency, significance, economy, availability, and adaptability. A review of literature was conducted in order to support his selection on the basis of the criteria used. Harris, in his study, indicated the validity and source of the criteria for the selection of content that Sturm used in this statement:

> While various authors, committees, and organizations have set up objectives to which all educational effort is expected to contribute, little has been said concerning definite criteria by which units may be selected or evaluated. Professor Kilpatrick of Columbia University is largely responsible for the development of one set of measures which seems worth considering. A group of graduate students under his direction checked these measures (viz., frequency, significance, availability, and economy) against a large number of units and found them to be satisfactory criteria. However, they were testing units as being socially important. A fifth measure, adaptability to school purposes, will serve to eliminate and limit some socially important aspects of present day life, and will further aid in the association of specific divisions with age, ability, and purpose groupings in the school system.[12]

Sturm, in his study, states that his review of the literature supports the following hypothesis:

1. That the graphic-arts content as now offered in shopwork in the secondary schools consists primarily of "letterpress" printing.
2. That the example of industry requires that the graphic-arts courses include a great deal more than letterpress printing.
3. That current educational trends demand a wider range of graphic-arts content in the industrial-arts curriculum.
4. That there is a lack of appropriate instructional material in related graphic-arts content.[13]

Bilsey,[14] in his study, concludes and recommends that the content areas be expanded. Essentially he draws a comparison between the unit shop in letterpress printing and the graphic-arts laboratory.

Reed,[15] in an experimental study, indicates that a wider scope of reproduction processes should be included in the secondary school level. While her study indicates that these areas be included in the art department, it is still indicative of the trend toward offering a broader scope in the field, whether it be in the industrial-arts or the fine-arts curriculum.

A review of the periodic literature reveals that much has been written about the inclusion of more areas than *letterpress* in the industrial-arts curriculum of the secondary schools.[16] This has been particularly true of such areas as silk screen, photography, offset lithography, bookbinding, and intaglio printing.

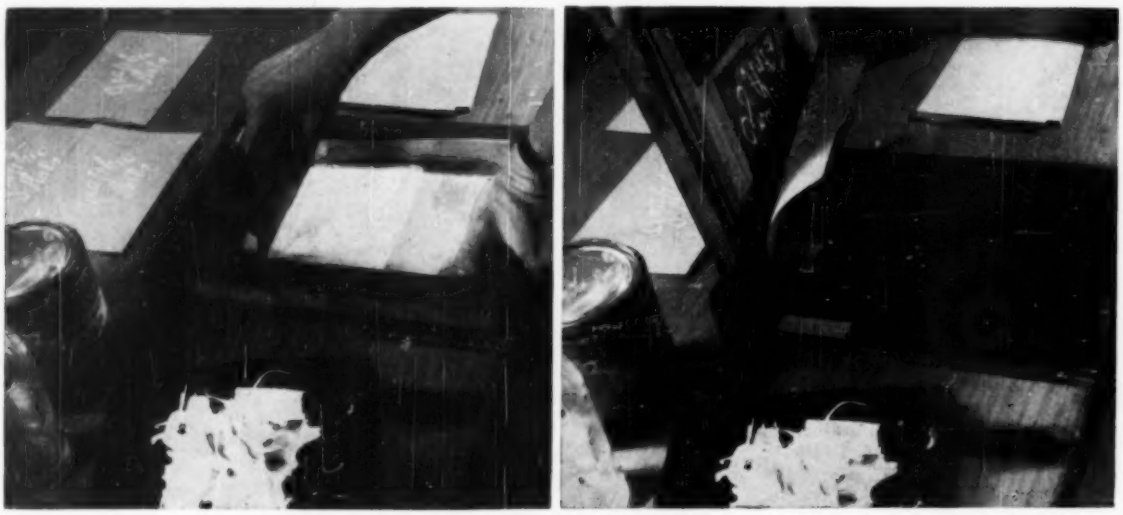
Marinaccio and Osburn, in their book, state in the foreword:

> It really never has been possible to understand graphic methods by merely setting type and printing from it alone. Packages, books, posters, floor and wall coverings, textiles, newspapers, and all other forms of print are being produced now more than ever before by new applications of old processes, some of which differ widely in principle and method from the more commonly known form of printing from type.[17]

Selection of Areas of Work

The areas of work, presented to the respondents for evaluation, were selected after reviewing the selections of Sturm,[18] Bilsey,[19] and Gernetzky.[20] Each area was annotated so that each respondent would

[10]Oakland, *op. cit.*
[11]Sturm, *op. cit.*
[12]Harris, *op. cit.*, p. 7.
[13]Sturm, *op. cit.*, p. 10.
[14]Bilsey, *op. cit.*
[15]Gladys Elizabeth Reed, "A Study of Graphic Arts Materials and Techniques Appropriate to the Secondary School," Unpublished Master's Thesis, Louisiana State University and Agricultural and Mechanical College, 1942.
[16]Roy R. Van Duzee and Raymond W. Sturm, "Planning and Equipping a Graphic-Arts Shop," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, XXX (June, 1941), 219–225.
[17]Anthony Marinaccio and Burl Neff Osburn, *Exploring the Graphic Arts*, p. xv (Scranton: International Textbook Company, 1942).
[18]Sturm, *op. cit.*, p. 86.
[19]Bilsey, *op. cit.*, pp. 41–42.
[20]Carl Gernetzky, "An Experiment in Printing to Determine the Content to be Taught in a General Graphic Arts Course," pp. 4–5. Unpublished Term Report, The Stout Institute, 1940.



Left — Screen stenciling: Forcing the paint through the screen. The frame was constructed in the school. Inexpensive organdy is used for the screen material. This is a popular process and used extensively in industry for small (600-800) runs of billboards, posters, bottle labels, etc. Right — Screen stenciling: Removing the printed copy from the screen

have a similar interpetation of the scope of each area from which selections might be made for a beginning course. The areas as they appeared in the questionnaire were as follows:

1. *Letterpress printing.* Foundry type and strip or piece border. Form locked-up and printed on hand lever press.
2. *Block Printing.* Linoleum, wood, rubber, or similar materials. Block to be locked in chase and run in one color. Suggested projects: bookplate, greeting card.
3. *Screen Stenciling.* Transparent film adhered to silk or organdy screen. Suggested projects: poster, greeting card, cover emblem, or design.
4. *Bookbinding.* Simple single sheet or signature binding. Suggested projects: student notebook or scrapbook, volume of magazines.
5. *Papermaking.* Pulp, egg beater deckle, and mold. Dye may be used to color paper.
6. *Typewriting.* Standard typewriter and carbon paper. Suggested project. business letter.
7. *Stereotyping.* Chalk plate or redi-mat to prepare original design for casting. Suggested projects: book mark, greeting card, dance program, letterhead.
8. *Photoengraving.* Half tone screen with zinc the medium used. Suggested projects: photoengraving from picture made in photography unit.
9. *Lithography.* Grained zinc plate. Design to be applied with crayon. Suggested project: display print.
10. *Photography.* Build a pinhole camera; take a picture with it; print and develop picture.
11. *Blueprinting.* Ink or pencil. Exposure to be made using frame and sunlight. Suggested projects: sketch, working drawing.
12. *Stencil Duplicating.* Wax stencil and mimeograph or similar machine. Suggested projects: Program, menu, advertising circular.
13. *Relief Etching.* Zinc, asphalt, and dragon's blood. Etching done with nitric acid.
14. *Rubberplate Printing.* Liquid rubber in beeswax mold, or molding compound in vulcanizing press. Suggested projects: name stamp, letterhead, greeting card, invitations.
15. *Intaglio Engraving.* Celluloid plates. Suggested projects: seasonal greeting card, announcement, display print, bookplate.
16. *Intaglio Etching.* Aluminum plates which may be etched with an alkali solution. Suggested projects: seasonal greeting card, announcement, display print, bookplate.
17. *Stenciling, Plain.* Paper on celluloid stencils and water color paints. Suggested projects: place cards, greeting cards, school emblem.
18. *Pantograph.* Reducing or enlarging a design. Suggested projects: enlarging or reducing a design for use with one of the other areas of work.
19. *Gelatin Duplicating.* Either gelatin roll in machine, gelatin pans, or gelatin pads. Ink, pencil, and typing may be done in various colors. Suggested projects: memo or assignment pad, posters, announcements.
20. *Marbling.* Printer's ink thinned with turpentine. Suggested projects: end sheets for scrapbook or notebook.

Aims and Objectives for Graphic Arts

Before specific objectives may be set up for any area of work in industrial arts, it is necessary to take into consideration the general objectives of industrial arts, and the industrial-arts objectives for the grade levels upon which the instruction is to be offered. Since it has been assumed previously that the proposed areas of work are to be offered on the secondary school level, industrial-arts objectives for the junior and senior high schools will need to be considered along with the general objectives.

Intaglio etching: Positioning the sheet on the plate

Simple as it looks is this process which utilizes an aluminum plate that has been etched in a weak alkali solution. The paper is soaked in water to soften the fibers. Ink is rubbed into recessed surface; then the excess wiped off. Press is inexpensive and easy to operate

Olstad[21] included general and grade level objectives in his comprehensive study of the philosophy of industrial arts. Bilsey[22] and Milburn[23] in their respective theses suggested specific objectives for teaching printing. Milburn also validated his list of objectives.

Many times excellent objectives are set up for a course or for a teaching unit, but when the course or teaching unit is taught, it is found that relatively few of the objectives are actually being met.

The writer, in an attempt to obtain a set of valid objectives upon which areas of work in the reproductive and related areas of graphic arts might be based, selected and condensed certain of Milburn's[24] and Bilsey's[25] objectives, added a few, and included the list in the check list for evaluation by the respondents. The following revised specific objectives are in accord with the general objectives cited by Olstad:[26]

1. To learn the basic operations involved in the graphic arts reproductive and related areas of work.
2. To develop an appreciation of good design, composition, and craftsmanship.
3. To learn to co-operate with others.
4. To develop a realization of the various methods and mediums by which designs, illustrations, and text matter may be reproduced.
5. To appreciate the possibilities and limitations of each of the various processes and mediums used.
6. To appreciate that there must be correlation between the type of design and the process used in reproducing the design.
7. To appreciate that the graphic arts have played an important part in advancing our civilization.
8. To know the relative rank and importance of the graphic arts industry in relation to the other large industries in our society.
9. To develop a realization of the employment opportunities open in the graphic arts industry.
10. To prepare for leisure time activities (hobby to follow).
11. To know the outstanding men in the graphic arts industries.
12. To develop the ability to judge the quality and usefulness of printed materials used in everyday life.

Selection and Classification of Respondents

Respondents were selected from a list of schools offering printing which was published in the *Graphic Arts Education*[27] magazine for November, 1942. A random sample was made in each state, the number selected roughly proportional to one for every seven schools offering printing instruction.

A postal card, with a return card attached, was mailed to the "Head of the Printing Department" of each school selected in the sampling. A total of 330 cards were mailed. Of this number 144 were returned; 134 indicated the respondent's willingness to co-operate in the study as is shown by Table 1. A high percentage of the respondents suggested the names of other instructors who believed would be willing to co-operate in the study.

Table 1 shows the distribution by states of the check lists that were mailed with a letter of transmittal to the 134 respondents who in acknowledging the postal cards had indicated their willingness to answer the questionnaire. A selection of

[21] H. B. Olstad, "An Analysis of Philosophies for Industrial Arts Education," pp. 75–76, Unpublished Master's Thesis, The Stout Institute, 1946.
[22] Bilsey, *op. cit.*, pp. 40–41.
[23] Milburn, *op. cit.*, pp. 30–31.
[24] Milburn, *op. cit.*, pp. 30–31.
[25] Bilsey, *op. cit.*, pp. 40–41.
[26] Olstad, *op. cit.*, pp. 75–76, 81–82.
[27] *Graphic Arts Education*, IX, Number Two (1942), 10–27.

sixty additional instructors was made from the referrals on the cards which were returned. This selection was based upon the need for increased returns from particular states and the completeness of the address given by the initial respondent. A second letter of transmittal was used for these instructors, which utilized the name, school, and city of the man who suggested that the prospect would co-operate. After a return of a majority of the check lists, a follow-up letter was mailed, and after the receipt of more check lists, the percentage of returns was computed. Table 1 shows the distribution by states of the 205 check lists mailed to instructors in 33 states and the District of Columbia, and the number and percentage of returns by states from respondents in 29 states and the District of Columbia. 164 returns from 205 instructors was the result. This gave a percentage of 80.0.

The data that follows is the result of an evaluation of opinions given by respondents in many different types of schools, some with trade experience, some without trade experience, some teaching in schools with vocational education objectives, and some teaching in schools with general education objectives. These factors seem to influence the opinions of the respondents to some extent. The data has been classified in several ways in order to bring to light any major differences in opinion occasioned by the factors previously mentioned. The various data is then compared in order to formulate the conclusions of the study.

The number and percentage of respondents having had trade experience, and those not having had trade experience, classified by junior high schools, senior high schools, other schools, and unclassified schools is shown in Table 2. The largest proportion of respondents, both with and without trade experience, are located in the junior high schools, senior high schools, and four year high schools. Seventy-five per cent of the total respondents have had trade experience. 26 per cent have not had trade experience, and 7 per cent did not report on this question.

The junior high school leads the general education group, with 31 per cent of the total respondents reporting general education as their primary objective as shown in Table 3. The senior and four-year high schools are next with 17 per cent and 16 per cent respectively. Seventy-four per cent of the total respondents indicated general education as the main broad objective of their respective schools. Sixteen per cent of the total respondents reported vocational education as their main objective, with "other schools" reporting 10 per cent of this figure. This latter classification includes vocational schools and colleges. Only 5 per cent of those reporting answered that their schools combined both objectives.

Bookbinding: Sawing kerfs for single sheet bookbinding

The boards holding the book will be chiseled off down to the bottom of the saw kerfs so that the sheets may be tied. This type of binding is easily within the ability of the beginning student

The majority of the respondents have had trade experience and are teaching in schools whose primary objective is general education.

Evaluation of Objectives

In Table 4 is presented a comparision of rank orders of specific objectives for teaching graphic arts reproductive and related areas of work as ranked by respondents who have not had trade experience, those who have had trade experience, and the total respondents. The reader will note that there is unanimous agreement between the three groups on the order of the objectives ranked one, two, three, four, five, ten, eleven, and twelve. The remaining objectives, except "To know the outstanding men in the graphic arts industries," have average weighted ratings of nearly "3" or over, which corresponds to the "important" rating in the check list.

On the basis of the data presented, the respondents with trade experience, and those without trade experience, are in agreement on the relative importance of specific objectives for a beginning course in the reproductive and related areas of work in graphic arts that were presented to them for evaluation.

TABLE 1. Number of Schools in Each State Teaching Printing, the Number of Postal Cards Sent to Each State and Returned, the Number of Check Lists Sent to Each State, and the Number and Percentage of Check Lists Returned From Each State

State	*No. of Schools Teaching Printing**	*No. of Postal Cards Sent*	*No. of Postal Cards Returned*	*No. of Check Lists Sent*	*No. of Check Lists Returned*	*Per Cent Returned*
Alabama	39	4	0	0	0	0
Arizona	8	4	1	4	3	75
Arkansas	20	2	1	1	0	0
California	238	17	8	15	11	73
Colorado	34	7	2	3	3	100
Connecticut	57	7	4	6	5	83
Delaware	8	1	1	0	0	0
Florida	27	3	0	0	0	0
Georgia	15	3	1	1	1	100
Idaho	7	2	1	2	0	0
Illinois	150	23	14	17	14	82
Indiana	111	16	7	8	7	87
Iowa	30	8	4	7	5	71
Kansas	50	10	6	8	8	100
Kentucky	25	3	2	3	2	66
Louisiana	16	0	0	0	0	0
Maine	15	2	1	2	2	100
Maryland	25	3	2	2	2	100
Massachusetts	193	17	4	6	3	50
Michigan	111	23	15	16	14	88
Minnesota	63	9	6	8	6	75
Mississippi	6	1	0	0	0	0
Missouri	36	5	3	7	6	88
Montana	7	2	0	0	0	0
Nebraska	13	3	1	0	0	0
Nevada	0	0	0	0	0	0
New Hampshire	10	3	1	1	0	0
New Jersey	127	15	5	9	6	66
New Mexico	4	0	0	0	0	0
New York	286	23	10	21	17	81
North Carolina	19	3	0	0	0	0
North Dakota	11	2	1	1	0	0
Ohio	153	23	7	13	10	77
Oklahoma	24	3	1	1	1	100
Oregon	8	2	0	0	0	0
Pennsylvania	166	18	6	9	8	89
Rhode Island	18	5	1	1	1	100
South Carolina	10	0	0	0	0	0
South Dakota	9	3	2	3	2	66
Tennessee	21	5	2	2	1	50
Texas	37	7	1	0	0	0
Utah	6	2	0	0	0	0
Vermont	6	1	0	0	0	0
Virginia	21	5	1	1	1	100
Washington	24	5	1	1	1	100
West Virginia	24	5	3	4	3	75
Wisconsin	74	24	16	19	19	100
Wyoming	1	0	0	0	0	0
Dist. of Columbia	40	4	1	3	2	66
Totals	2384	330	144	205	164	80

**Graphic Arts Education*, IX, Number Two (1942), pp. 10-27.

TABLE 2. Number and Percentage of Total Respondents Having Trade Experience and Those Not Having Trade Experience; Classified by Schools

School Classification	Number of Respondents Having Trade Experience	Percentage of Total Respondents Having Trade Experience	Number of Respondents Having No Trade Experience	Percentage of Total Respondents Having No Trade Experience
Junior high school	35	23	16	10
Senior high school	24	16	13	9
Four-year high school	27	18	4	3
Junior-senior high school (6-year school)	8	5	5	3
Other schools	20	13	0	0
Unclassified schools	0	0	1	1
Total	114	75	39	26
(*Total respondents* 153)				

TABLE 3. Number and Percentage of Respondents Whose Principal Objective in Teaching Is General Education, Vocational Education, and Those Combining Both Objectives; Classified by Schools

School Classification	Number of Respondents Whose Principal Objective Is General Education	Percentage of Total Respondents Whose Principal Objective Is General Education	Number of Respondents Whose Principal Objective Is Vocational Education	Per Cent of Total Respondents Whose Principal Objective Is Vocational Education	Number of Respondents Combining Both Objectives	Percentage of Total Respondents Combining Both Objectives
Junior high school	51	31	2	1	0	0
Senior high school	28	17	6	4	4	2
Four-year high school	27	16	2	1	2	1
Junior-senior high school (6-year school)	10	6	1	0	2	1
Other schools	4	2	16	10	0	0
Unclassified schools	2	1	0	0	0	0
Total	122	73	27	16	8	4

Evaluation of Areas of Work

In interpreting the significance in the evaluation of the areas of work by the respondents, some attention must be directed to the supposition that those instructors who have had trade experience will tend to be influenced by that experience in their evaluation; that those respondents who have not had trade experience will tend to be influenced by their lack of this experience; that those who teach the areas, will, to some degree, evaluate those particular areas of work higher in order to justify what they teach; and that those who do not teach various areas of work will tend, at least to some degree, to minimize the evaluation of those areas. The data presented seems to support this supposition, as will be pointed out in the following discussion of the tables.

Letterpress printing is ranked first in the order of importance in the opinion of the respondents who have had trade experience as shown in Table 5. The average weighted rating for letterpress printing is 4.60, which is considerably higher than the rating for any other area of work. This may be attributed to most of the respondents having had trade experience and teaching experience in this area of work. *Gelatin duplicating* is considered the least important, ranking last in the order of importance.

Of those respondents not having had trade experience, Table 5 indicates that letterpress printing is ranked number one in importance. The average weighted rating for this area of work is considerably higher than for any other areas of work evaluated. All 39 of the respondents who do not have trade experience teach this area of work, and thus consider it highly important. Marbling and intaglio engraving rank last, in the order of importance.

TABLE 4. A Comparison of Rank Orders of Specific Objectives for Teaching Graphic Arts Reproductive and Related Areas of Work as Ranked by Various Classifications of Respondents

Specific Objectives	Rank Orders: Respondents With Trade Experience	Respondents Without Trade Experience	Total Respondents
To learn the basic operations involved in the graphic arts reproductive and related areas of work.	2	2	2
To develop an appreciation of good design, composition, and craftsmanship.	3	3	3
To learn to co-operate with others.	1	1	1
To develop a realization of the various methods and mediums by which designs, illustrations, and text matter may be produced.	7	6	7
To appreciate the possibilities and limitations of each of the various processes and mediums used.	10	10	10
To appreciate that there must be correlation between the type of design and the process used in reproducing the design.	8	9	8
To appreciate that the graphic arts have played an important part in advancing our civilization.	4	4	4
To know the relative rank and importance of the graphic arts industry in relation to the other large industries in our society.	9	8	9
To develop a realization of the employment opportunities open in the graphic arts industry.	6	7	6
To prepare for leisure time activities (hobby to follow).	11	11	11
To know the outstanding men in the graphic arts industries.	12	12	12
To develop the ability to judge the quality and usefulness of printed materials used in everyday life.	5	5	5

TABLE 5. A Comparison of Rank Orders of Graphic Arts Reproductive and Related Areas of Work as Ranked by the Various Classifications of Respondents

Areas of Work	Rank Orders: Trade Experience	No Trade Experience	Teach Areas of Work	Do Not Teach Areas of Work	Total Respondents
Block printing	3	2	11	2	2
Blueprinting	14	5	3	12	11
Bookbinding	2	4	10	4	4
Gelatin duplicating	20	15	17	17	18.5
Intaglio engraving	13	19.5	15	15	15
Intaglio etching	16	18	18	16	16
Letterpress printing	1	1	1	1	1
Lithography	10	11	2	9.5	9
Marbling	17	19.5	20	20	20
Pantograph	19	16	13.5	19	18.5
Papermaking	5	6	12	5	5
Photoengraving	7	10	9	7	8
Photography	8	13	7	8	10
Relief etching	11.5	14	16	13	13
Rubberplate printing	15	7	19	14	14
Screen stenciling	4	3	8	3	3
Stencil duplicating	11.5	9	13.5	11	12
Stenciling, plain	18	17	5.5	18	17
Stereotyping	6	12	4	9.5	7
Typewriting	9	8	5.5	6	6

Letterpress printing, in the opinion of those respondents who teach the areas of work presented for evaluation, ranks first in the order of importance, as shown by Table 5. These respondents considered marbling least important.

Letterpress printing still maintains its number one rank in the opinion of the respondents who do not teach the areas of work presented for evaluation as shown in Table 5. Marbling remains in last place in the order of importance. A high percentage of these respondents had no opinion in regard to the areas of work.

The influence of teaching or not teaching these areas of work is brought out by a comparsion of the rank orders in Table 5. In most cases those who teach these areas of work have rated them from 1 to 2 points higher than those who do not teach them. This would seem to indicate that the respondents who teach the areas evaluated them consistently higher in order to justify what they teach.

In the opinion of the total respondents, as shown in Table 5, letterpress printing is first in importance. The least important item in their evaluation is marbling. Block printing, screen stenciling, and book-

binding are significantly high in the rank order of importance. It should be noted, however, that with the exception of letterpress printing, no other area of work has an average weighted rating as high as 3, which corresponds to the rating of important on the check list.

In order to forestall any hasty negative decisions by the respondents, they were asked to check a reason, or reasons, why an area was not suitable or desirable if they checked the latter response on the check list. Table 6 indicates the frequency of these responses.

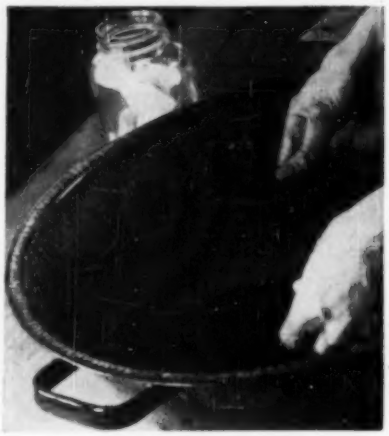
In general, it seems as though the areas of work which have the lowest percentage of respondents reporting that they teach that area, as shown in Table 7, also have the highest frequency of reasons checked as to why they are not suitable or desirable.

For example, gelatin duplicating has but 6 per cent of the total respondents teaching that area of work (Table 7), but it has a total of 41 responses indicated as to why it is not suitable or desirable (Table 6). Intaglio etching has 8 per cent of the total respondents teaching the area (Table 7), but has a total of 56 responses listed as to why it is not suitable or desirable (Table 6).

Conversely, block printing has 61 per cent of the total respondents indicating that they reach the area (Table 7), with only 4 responses indicating that the area of work is not suitable or desirable (Table 6). This would seem to indicate that the less familiar the respondents are with an area of work the more they tend to evaluate it as not suitable or desirable.

TABLE 6. Frequency of Reasons Checked by Respondents Marking the "Not Suitable or Desirable" Column in Connection With the Graphic Arts Reproductive and Related Areas of Work

	Frequency				
Areas of Work	*Too Much Time Required*	*Not in Accordance With Objectives*	*Too Difficult*	*Too Dangerous*	*Other Reasons*
Block printing	2	2	0	0	0
Blueprinting	3	17	0	0	4
Bookbinding	7	4	2	0	2
Gelatin duplicating	9	25	0	0	7
Intaglio engraving	18	16	17	0	3
Intaglio etching	17	14	19	3	3
Letterpress printing	0	1	0	0	0
Lithography	8	9	16	0	3
Marbling	8	7	5	0	3
Pantograph	8	12	6	0	4
Papermaking	10	3	3	0	1
Photoengraving	17	5	25	0	6
Photography	7	25	4	0	0
Relief etching	5	10	14	9	1
Rubberplate printing	6	12	6	0	3
Screen stenciling	2	6	0	0	5
Stencil duplicating	3	16	0	0	2
Stenciling, plain	3	20	0	0	0
Stereotyping	3	8	8	8	3
Typewriting	3	19	1	0	4
Totals	139	229	106	20	54



Paper making: Forming the sheet
A pan of water, egg beater, fine wire screen, rubber gasket, and a few blotters are all that are necessary to teach the principle of paper making. Paper mill sheet pulp is used for pulp, although paper toweling stocks may be used

TABLE 7. Frequency and Percentage of Respondents Teaching the Reproductive and Related Areas of Work and the Frequency and Percentage of Respondents Indicating That These Areas Are Taught by Another Department

Areas of Work	*Number of Respondents Teaching Area of Work*	*Percentage of Total Respondents Teaching Area of Work*	*Number of Respondents Reporting Area of Work Taught in Another Department*	*Percentage of Total Respondents Reporting Area of Work Taught in Another Department*
Block printing	100	61	55	33
Blueprinting	17	10	102	62
Bookbinding	81	49	15	9
Gelatin duplicating	10	6	53	32
Intaglio engraving	20	12	10	6
Intaglio etching	14	8	3	1.8
Letterpress printing	135	82	2	1.2
Lithography	14	8	1	0.6
Marbling	34	20	7	4
Pantograph	16	9	17	10
Papermaking	37	22	7	4
Photoengraving	11	6	5	3
Photography	14	8	50	30
Relief etching	17	10	6	3.6
Rubberplate printing	17	10	3	1.8
Screen stenciling	48	29	30	18
Stencil duplicating	15	9	70	42
Stenciling, plain	8	5	41	25
Stereotyping	27	16	3	1.8
Typewriting	7	4	101	61

Only three areas of work were pointed out by the respondents as too dangerous, as is shown in Table 6. These are intaglio etching, relief etching, and stereotyping. The frequency of mention was not significant in any of the three. Photoengraving has the highest frequency of responses, indicating that it is "not in accordance with objectives." Photography ranked second in this respect. Photoengraving ranked first in the number of responses, indicating that too much time is required to teach this area of work.

Other reasons were given by the respondents why various areas of work were not suitable or desirable; these are tabulated in Table 6 under *other reasons*. No single reason had a significant frequency of mention.

The respondents reported that blueprinting, typewriting, stencil duplicating, block printing, gelatin duplicating, and photography, in that order, were taught in departments other than their own, as shown in Table 7. This does not seem to have influenced the respondents' evaluation of these areas appreciably, inasmuch as some of these areas are ranked high in the order of importance, and some are ranked low, as is shown in Table 5.

A comparison of the rank orders by the five classifications of respondents is shown in Table 5. Letterpress printing ranks first in each classification. Block printing ranks second in three classifications. Bookbinding, intaglio engraving, intaglio etching, marbling, papermaking, and screen stenciling also receive the same ranking in three classifications. Marbling is in the last place in four out of the five classifications. Blueprinting ranks fourteenth in the opinion of the respondents who had had trade experience, fifth in that of those who had no trade experience, third in the opinion of those who teach blueprinting, twelfth in that of those who do not teach blueprinting, and eleventh in the opinion of all the respondents.

Summary and Conclusions

A review of the literature indicated objectives considered important by others. These objectives were included in the writer's check list for evaluation by the respondents. All but one of the objectives presented were considered important.

Subject matter content was treated in the same way, i.e., a list of areas was selected from the review of the literature and presented to the respondents for evaluation. Letterpress printing which was taught by most of the respondents was the only area which received a rating of important. However, the rank order of the other areas evaluated should be con-

sidered significant for purposes of comparing the importance of one area with another. Only two areas (i.e., letterpress printing and block printing) were taught by more than 50 per cent of the respondents; six areas were taught by more than 20 per cent of the instructors reporting, i.e., letterpress printing, block printing, bookbinding, marbling, papermaking, and screen stenciling. This would seem to indicate that conditions have not changed materially in the past 10 to 15 years, if the respondents are typical of the majority of the printing teachers in the nation.

The most frequent reason given by the respondents for not including a wider range of areas was: "Not in accordance with objectives." Too much time required" ranked second in this respect. Presumably, since the respondents rated all of the objectives as "important" they felt that most of these objectives would be met by teaching only letterpress printing.

Two areas of work. i.e., blueprinting and typing, were reported by over 50 per cent of the respondents as being taught in other departments; seven areas, i.e., block printing, blueprinting, gelatin duplicating, photography, stencil duplicating, plain stenciling, and typewriting, were reported by over 20 per cent of the respondents as being taught in other departments. This would seem to indicate that if an area is already being taught in another department of a school, there would be no need of teaching it in the graphic-arts course.

Recommendations

The writer, on the basis of the data obtained from his study, recommends:

1. That as wide a range of areas of work be included in a beginning course as circumstances in each situation will permit.

2. That the specific objectives evaluated in the study be given consideration in setting up any program in the reproductive and related areas of work on the beginning level.

3. That the rank order of the areas of work evaluated in the study be used as priority guide in selecting areas for inclusion in a beginning course.

4. That if any of the areas of work are already being taught by other departments in the school, it is recommended that instruction in these same areas not be duplicated in the graphic arts course. Other departments in the school, such as the fine arts department, should be co-ordinated more closely with the graphic arts department in such cases.

5. That further study be undertaken in each of the areas of work recommended in order to provide valid material for the preparation of a resource unit in each of the areas.

6. That teacher training institutions provide outgoing teachers of graphic arts with a wider background of the many methods of reproduction and their allied areas of work.

7. That a study be made to determine the relative time desirable to spend on each area of work recommended in the present study.

8. That equipment costs be kept within a range in keeping with the scope of the instruction offered.

SUPERVISOR'S CHECK LIST FOR INDUSTRIAL ARTS AND ELEMENTARY CRAFTS

D. ARTHUR BRICKER
Supervisor of Industrial Arts
Public Schools
Cincinnati, Ohio

This check list consists of items related to significant aspects of an industrial-arts and elementary crafts program. It is intended for use in the evaluation and improvement of instruction and classroom management in this subject field.

Directions. Opposite each of the items to be checked, circle the number that indicates your evaluation with respect to the item: (5) outstanding; (4) above average; (3) average; (2) below average; (1) poor.

A. General condition of shop.. 5 4 3 2 1
Orderly — place for everything — clean — locker space assigned — care of projects under way or completed — status of pupil stations — lighting — care of unfinished projects — status of painting or finishing area.

B. Hand tools 5 4 3 2 1
Condition — usability — storage — accessibility — method of checking.

C. Power equipment 5 4 3 2 1
Safety features — use of guards — drill press table — regular oiling and care of motors — place for extra parts.

D. Safety provision and practices 5 4 3 2 1
Pupils' clothing — safety zones — location of tools and equipment — evidence of safe practices — power cords and outlets.

E. Handling supplies 5 4 3 2 1
Ordering — storing — distributions.

F. Pupil personnel organization 5 4 3 2 1
Clean-up organization — definite assignments.

G. Pupils' projects 5 4 3 2 1
Selection — Finish and workmanship — careful planning.

H. Pupil interest 5 4 3 2 1
Work habits — interested in projects — interest in the shop — attitude toward school property — absence of unnecessary noise — horse play — everybody busy.

I. Pupils' work habits 5 4 3 2 1
Care of tools — proper tool for the job — orderly attack — care of table and bench tops.

J. Pupils' respect for teacher and shop regulations.... 5 4 3 2 1
Willingness to co-operate with teacher and other class members.

K. Teacher's desk and library facilities 5 4 3 2 1
Place to work and plan — orderly — teaching aids — cost accounting.

L. Teacher initiative and interest 5 4 3 2 1
New projects — interesting models — development of instruction sheets — participation in work of committees for the industrial arts program — develops and shares suggestions that will benefit other teachers.

M. Professional appearance of teacher and pupils 5 4 3 2 1
Suitably dressed for work — use of shop aprons — grooming — makes a favorable impression.

N. Teaching aids 5 4 3 2 1
Use and care of books, charts and display materials — use of films and slides — proper use of display models.

O. Pupil achievement records.. 5 4 3 2 1
Has record of pupil's past work — maintains record of present year's work.

P. Co-operation 5 4 3 2 1
With fellow teachers—principal—building custodian—central office—special subjects, e.g., Red Cross and Christmas toy program.

Q. Teacher's personal qualities 5 4 3 2 1
Uses appropriate language — promptness — wholesome attitudes — reliability — efficiency — finishes what he begins — not easily excited — readily adapts self to most situations.

R. Subject preparation and qualifications 5 4 3 2 1
Schooling — teaching in areas of college preparation — reads and studies in his field — interested in other subject fields — has critical and analytical mind, not bound by tradition — open to convictions.

S. Correlation with other subject areas 5 4 3 2 1
Correlates work with instruction given in art, science, and language arts.

T. Class preparation — presentation 5 4 3 2 1
Well-planned demonstrations and discussions — follows course of study — holds interest during demonstrations — uses language effectively — knows subject matter.

The Teacher's View on Supervision

G. C. HENRIKSEN

Supervisor, Industrial Arts and Vocational Education

Public Schools

Portland, Ore.

It is probably safe to assume that ever since the teaching of manipulative skills was inaugurated in the schools of our country, the problem of supervision has always been a subject of major consideration. Innumerable suggestions have found their way into print from time to time in the form of books, pamphlets, and magazine articles. Much of this material has been excellent, prepared as it was by persons experienced not only in the field of supervision but also with the background of many years' teaching experience.

Examination of the material shows it has been written and published more from the standpoint of the supervisor than from the standpoint of the teacher. It is perhaps possible that a supervisor who has risen from the ranks of teachers has a fairly good understanding of what the teacher wants from a supervisor. At the same time it is probably true that just as soon as a person steps from the role of teacher to that of supervisor, a certain change in attitude and in viewpoint takes place, which is just another way of saying that only a teacher can fully understand and comprehend the teacher's attitude.

If the foregoing is true, it appears reasonable that in the midst of the abundance of published material concerning supervision perhaps a small niche can be found for the opinions of teachers on this important matter. With this in mind, the writer recently asked a group of industrial-arts teachers, 27 in number, to prepare individual statements as to what they expect from a supervisor. These teachers were members of an in-service training class and represented a large number of areas in the industrial arts and vocational education field. The members of the class were given to understand that such opinions would not be graded and that the papers should be submitted anonymously. Emphasis was placed on the fact that the comments should refer to supervision in general with no particular supervisory person in mind. There seems to be a good scatter in the type of answer given which may be interpreted as indicating that the persons involved were expressing their true feelings.

Personal Qualifications

More comments were given in this area than in any other, which may lead one to believe that which is generally accepted as being true, namely, "how to win friends and get along with people" is still the most important factor in any job. A few of the more frequent comments are as follows:

1. Must be able to give criticism in the spirit of helpfulness.
2. Must be able to impart inspiration.
3. Must be willing to accept responsibility.
4. Must have courage to make decisions and back them up.
5. Must have a sense of humor.
6. Must be co-operative with an appreciation of the viewpoint of others.
7. Must use good judgment.
8. Should not play politics.
9. Must work for the good of the entire group.
10. Must possess the following attributes: sincerity, impartiality, courtesy, tact, enthusiasm, honesty, kindness, and punctuality.

Some of the individual comments are as follows:

"A supervisor should be a person who can radiate self-confidence in his ability, coupled with modesty, and who, when criticizing, can do it in a spirit of helpfulness."

"The characteristics of a successful supervisor should include being a strong motivator for all that may be good, ability at counseling his teachers in avoiding pitfalls, and a spirit of enthusiasm for his job."

"A supervisor should be able to introduce tactfully his ideas, be considerate and tolerant of the rights and opinions of others, just and impartial in his decisions, but with courage to make them."

"I would like my supervisor to be a person I am glad to have come to my shop, either occasionally or by invitation. The teacher should feel inspired, that he and his work have been helped and that in general his work will be better because of the visit."

"I hope my supervisor is one who is able to commend me for any good work I may be doing. I trust he won't forget to give me that pat on the back, not that my work is perfect, not that the end result could not have been better, but if as a teacher I am trying my best to give value received, I feel a boost will do more for me than a kick."

"I expect him to be a man with a sense of humor, who is well posted in his line of work and is able to give and take."

As is perfectly obvious, the above qualities are those which are essential for any supervisor to possess if he hopes to make a success out of his job.

Educational Qualifications and Background

In this area there seems to be some difference of opinion as to the type of education a supervisor should have. Some seem to think that a supervisor should have a comprehensive knowledge in all areas of activity, while others believe that a supervisor should have highly specialized training in one field. While the following comments do not specifically refer to the type of education which a supervisor should have received, they do indicate the end result desired.

"The supervisor should know how to teach and should understand the problems of the classroom teacher. I think the supervisor should do some teaching in the classroom at least every three years."

"I would expect such a person to have a good general knowledge and comprehension over the field that embraces his responsibility. He should be a highly specialized individual in at least one branch of skills in the boundary of his supervision, but certainly we should not expect such a person to be a 'jack of all trades.'"

"I do not expect him to be a 'know-all,' a dictionary, or an encyclopedia, but I do expect him to be able to put over his point so that it can be understood by a layman rather than by college professors."

"The supervisor should have a working comprehension of the policies of the school and his superintendent's philosophy of education; then the supervisor's philosophy of education should be clear. This should lead to a spirit of co-operation and eventually to teaching that is direct and forceful."

"The supervisor should have adequate and practical training enough to command the respect of his teachers."

None of the comments indicated the type of degree which a supervisor should have, if any, nor the nature of the type of work involved in securing a degree. It is interesting also to note that none of the answers specified any particular area of skill which the supervisor should possess.

There were, however, many comments which indicated that the supervisor must keep himself thoroughly informed and acquainted with the latest trends and developments in his field so that he can pass them on to the teachers.

Services

The study shows that teachers expect supervisors to help them by rendering a variety of services. Prominent among the services suggested by teachers as part of a supervisor's duties are the following:

1. Maintain an exchange of ideas.
2. Help teachers with teaching techniques.
3. Provide teachers with appropriate projects at different grade levels.
4. Pay visits to teachers at regular intervals.
5. Select texts to be used in industrial arts.

6. Select and allocate materials and supplies.
7. Keep instructors informed on new developments, reference materials, including visual aids, and trends in industrial arts.
8. Be available for conferences and for counseling.
9. Conduct classes for instructors.

Some of the statements are as follows:

"Keep the supply requirements fluid and check that the grabber does not get more than his share."

"The supervisor's office offers a great service in its issuance of handbooks, pamphlets, periodical bulletins, and maintaining a professional library."

"The classes, some for college credits and others for the instruction and knowledge gained by each individual participating, is a very good stimulant that the supervisor's office can sponsor."

"I would expect my supervisor to keep me posted on other instructors' projects, procedures, techniques., etc., good and bad."

"When there is no course of study available, the supervisor should assist the instructor to organize one, or suggest what should be taught."

Techniques

In order to accomplish the things which have been listed under *services*, teachers suggest a number of devices and techniques. A suggestion which many made is that of conducting monthly meetings with the instructors at which the latest books and projects can be discussed. It is also suggested that this meeting can be used for the purpose of giving instructors an opportunity to show some of the projects which the students in their classes have made. Another technique which has been suggested is the following:

"The supervisor should, if possible, declare a visiting day when the industrial-arts teachers may have an opportunity to visit either local or near-by city schools. I believe many helpful ideas could be obtained from such a visit. Also a good neighbor or friendly feeling could be built up between our schools and those near by."

Several instructors mentioned the value of monthly letters to the teachers concerning details on the operation of their shop, as well as copies of any new catalogs, pamphlets and the like, which may be available. It would be extremely interesting to have the reaction of supervisors to these comments of instructors.

If one is to compare the results of this study with various articles written by supervisors, teachers place far more emphasis upon the personality qualifications of supervisors than do the supervisors themselves.

It is also interesting to note that teachers prefer to have courses of study and texts chosen for them rather than to have any sense of obligation in the selection of that material. Why this should be is rather difficult to understand. One would think that teachers would prefer to select their own materials. Perhaps one of the reasons is the fact that many teachers have taught under a system of regimentation where initiative and individual thinking has not been recognized and given an opportunity to develop. Another reason may be just pure mental laziness on the part of some teachers.

The comments as a whole seem reasonable to the writer, who thinks that an occasional scrutiny of the above reactions of teachers would be helpful to all supervisors. While supervisors plan together for ways and means of helping teachers, the workability of these plans is the keynote of their worth. One of the best means of determining that worth is from the teachers themselves.

English for Trade and Vocational Schools

J. ALLEN MORRIS
Murray Vocational School
Charleston, S. C.

(See preceding articles in January, September, and November, 1948, and January, May, June, and November, 1949, issues)

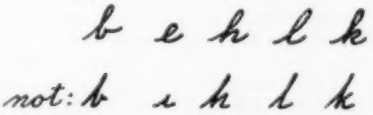
Improving Students' Handwriting

Many of the mistakes in spelling made by vocational school students can be traced to long-established habits of carelessness. Many boys know how to spell correctly most of the words they misspell in their written work. Almost always the papers of these students are poorly written, lacking in neatness of appearance as well as in accuracy and correctness.

For several years I wondered what to do to help the boy who said, quite truthfully, "My handwriting has always been bad." He takes for granted that it always will be bad; and unless his instructor knows how to help him to improve his handwriting, he is right — it will. Just telling him that his handwriting is unsatisfactory is not enough. The instructor must be able to diagnose the cause of the trouble and make specific suggestions for improvement. The method described herewith presents a workable way to do this, for in the past ten years I have had considerable success in improving the work of hundreds of students by showing them how to write correctly a few letters of the alphabet.

The instructor must be sympathetic and the student co-operative; otherwise no progress can be expected. Occasionally a boy is unwilling to follow suggestions that would help him, but most boys are pleased with the quick, noticeable improvement in the appearance of their papers and are willing to continue improving their handwriting until it is completely satisfactory in every respect.

The chief letters that are badly formed in the work handed in by most boys are *b, e, h, l, and k*. I call these "loop letters" because they should be formed with loops:



When they are not written with loops, the resulting handwriting is usually hard to read and generally produces numerous careless mistakes in spelling and capitalization. If a boy has trouble with loop letters, he should start improving only one at first, preferably the letter *e*. The instructor can point out errors in spelling that come from confusing a "loopless *e*" with an undotted *i*. Incidentally, the boy who has *loop-letter trouble* often forgets to dot i's and cross t's. A few words will suffice to get the idea across to the student: thin — then; winch — wench; litter — letter; inter — enter; pin — pen; pit — pet, etc.

As soon as a boy starts writing *e's* properly, his work immediately starts to look better and he is ready for *l* — because it is so much like *e* and because it causes spelling errors when confused with uncrossed *t's*. The type of student who is working on *e* and *l* will carelessly write *William Pill* for *William Pitt* or *lillte* for *little*. When he has learned to write *e's* and *l's* with loops, *b, h,* and *k* will be easy. Soon after, his work will be noticeably cleaner and neater, with fewer mistakes in spelling, capitalization, and punctuation

because the writer can see more clearly what he has written and can check his work more accurately.

Two other letters cause trouble simultaneously: *d* and *t*. Usually the same boy who writes *b*, *e*, *h*, *l*, and *k* without loops will write *d* and *t* with loops. If this habit produces no errors in a boy's work, and if his papers are otherwise clean, neat, and carefully checked, I do not suggest any change in *d* and *t*. If I consider that his work will be still further improved by writing *d* and *t* without loops, I persuade him to try this change; it generally produces satisfactory results. Forming this new habit requires time; it cannot be achieved overnight. If the instructor will patiently continue to suggest the improvement and the student will really try to make it, the desired change takes place after a while.

The letters *a* and *o* frequently cause errors in spelling when one is used for the other: boat — boot; mast — most, mare — more; salve — solve; whale — whole; reward — reword; park — pork; cat — cot; hat — hot; warm — worm, etc. I do not remember the source of the story about the newspaper reporter who embarrassed a military hero by referring to him as a *battle-scared* soldier, and in attempting to correct the error in the next issue found that the typesetter had changed *battle-scared* to *bottle-scarred*, but it has a point for the student who writes *a's* that look like *o's*. Here, also, time and patience are needed. Eventually, long after the student has become aware of his trouble, he will find himself writing these letters clearly as a matter of habit, and his spelling errors will decrease perceptibly.

Some boys habitually use a capital *C* for a small *c* and a small *t* for a capital *T*. There is usually no ignorance of rules of capitalization, just carelessness in forming the letters. Correcting these is not easy, but it can be accomplished. If for a while a boy will put a "dragline" (a connecting line) on each small *c* until he has learned to start the small *c* nearer to the bottom rather than at the top of the line, he will gradually overcome the habit of using a capital *C* where a small *c* should be used. Boys who form capital *T's* like small *t's* often misspell words like *Tuesday, Thursday*, though they realize that these words should be capitalized. If these boys will practice deliberately putting the top of the *T* over the rest of the letter, in time their capital *T's* will be regularly different from their small *t's*.

The indefinite articles *a* and *an* are often confused, just as the letters *m* and *n* are frequently used incorrectly; as, for example, in a sentence like this: "*A* auto *n*echan*m*ic has repaired *an* Pon*n*tiac." This is exaggerated for effect, but the idea is correct enough. I have had to work on these errors in the papers of thousands of boys. If this *a* for *an* error occurs only once in a student's work, it is unimportant. Usually, however, it recurs frequently and requires some attention. The following explanation sheet and drills are helpful:

"A — AN — AND"

The letter *a* means *one* (1). The word *an* means *one* (1).

An is used in front of words that start with vowels (A-E-I-O-U).

Examples: an apple — an egg — an Indian — an orange — an uncle

Meaning: one apple — one egg — one Indian — one orange — one uncle

An is used before a vowel because it is easier to say "an apple" than "a apple."

A is used in front of words that start with consonants (B-C-D-F-G-H-J-K-L-M-N-P-Q-R-S-T-V-W-X-Y-Z).

Examples: a bicycle — a chisel — a father — a lathe

Meaning: One bicycle — one chisel — one father — one lathe

And is a conjunction; it is used to join words, phrases, clauses, and sentences:

In compound subjects:

John *and* Tom went to the game.

In compound verbs:

The mechanic drilled *and* hammered.

In compound phrases:

"In one ear *and* out the other. . . ."

In compound sentences: The boy worked very hard, and he was soon promoted.

Drill I: Write these sentences on your paper, using "a" or "an."

The war came to . . . end. It is bad to eat . . . green apple. The girl had . . . party for her birthday. . . . automobile was stolen last night. He made . . . oyster knife in the shop. He wants to be . . . electrician when he is older. . . . chisel is missing. . . . eagle is a large bird. The car had . . . flat tire. The boy won . . . free ticekt to the circus.

Drill II: Make a list of ten words beginning with the letter *a*. Make a list of ten words beginning with the letter *e*. Make a list of ten words beginning with the letter *i*. Make a list of ten words beginning with the letter *o*. Make a list of ten words beginning with the letter *u*.

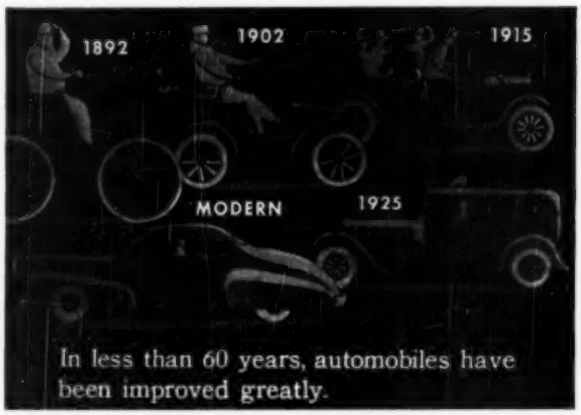
Use a dictionary for this. Each of the fifty words must be a *noun*. Before each noun use *an* because the noun begins with a vowel.

Another habitual error, very hard to eradicate, is the use of *m* for *n* and *n* for *m*, causing confusion of words like the following: seen — seem; line — lime; sun — sum; gun — gum; worn — worm; bean — beam; new — mew; night — might; noose — moose, etc. This is not caused by ignorance of the correct way to spell words containing *m* and *n* and is more than "just a careless mistake," for it continues to recur for some time after a boy has become aware of it as a bad habit and has begun to try to avoid it. To attract a student's attention to this, I use the following drill:

M — N

Rewrite the following sentences, changing *m* to *n* and *n* to *m*:

he cane to see his nother i an late every normimg they played ganes om the deck of the steaner his mane is joe i kmow hin very well after trinnimg the hedges we wemt im swinnimg he s beem conimg late to school too nuch what tine is it he was rummimg



This frame from "Engines, Rails, and Roads," in the "Transportation Around the World" series of filmstrips, latest release of the Popular Science Publishing Co., Audio-Division, 353 Fourth Ave., New York City, shows the development of the automobile from its earliest beginnings to today

whem i saw hin them suddemly he fell dowm the nam fired his shotgum and them ram away plame these boards snooth

This short drill does not cure the trouble, but it shows how odd some words look when *m* and *n* are used incorrectly. As other errors in written work occur, the instructor should point out each one (when a boy, for example, writes *meed* for *need*, *mane* for *name*, etc.). If the instructor will send the writer to the dictionary to look up and write the meanings of *meed, need, mane, name*, etc., this will help. For all types of errors in writing letters of the alphabet, *make-up* work is useful as a last resort. If a boy habitually writes *m* for *n* and continues to do this after completing the *M-N* drill and after he knows better, he can be required to write several times the correct form of the word he missed. By increasing steadily the amount of *make-up* work, the instructor can put enough stress on the error to enable the student in time to avoid it altogether. The same method, of course, can be used for mistakes in using *C* for *c*, *t* for *T*, *a* for *an*, and *a* for *o*.

In order to interest boys in the idea of forming letters of the alphabet correctly, I use a number of errors in spelling taken from local newspapers, the *New Yorker Magazine*, etc. One of these, for example, comes from the front page of the Charleston (S. C.) *News and Courier*. Under a picture of the White House porch is the caption: "President Franklin D. Roosevelt takes his fourth term *bath* on the rear porch of the White House as diplomats, members of Congress and distinguished guests look on in the foreground, standing in the snow. On the porch are cabinet members, Supreme Court justices, and their wives." A collection of such errors, which can be gathered easily by any instructor in a short time, seems to help.

Another useful device is a list of words in which the changing of one letter makes a different word. Reading a list of words like these (all taken from student errors in written work) impresses upon a student the importance of individual letters of the alphabet and helps him to understand the necessity for accuracy in spelling: reckless — wreckless; carless — careless; quit — quite — quiet; coma — comma; river — driver; holy — holly; kind — king; book — boob; girl — grill; pat — pet — pit — pot — put; litter — letter; bather — bother — brother; steal — steel; scared — scarred; much — muck; battle — bottle; lathe — lather; silver — sliver; manger — manager; stain — slain; crow — crowd; corner — coroner; marrying — marring; message — massage; break — freak; cam — came; stationery — stationary; altar — alter.

(To be continued)

Associated Guilds of Teachers of Industrial Arts, New York City

JOHN HURLEY
Assistant Supervisor of Elementary and Junior High School Industrial Arts
Brooklyn, N. Y.

The Associated Guilds of Teachers of Industrial Arts of the City of New York lays claim to being the oldest and largest single organized association of its kind in the United States, and most likely, in the world. It has a potential membership of about seven hundred men teachers of industrial arts in the elementary and junior high schools of this city. It was organized in 1910.

The rapid growth in the number of industrial arts and vocational education teacher organizations throughout the country is evidenced by the number of requests received for information on organizing and setting up a constitution for those groups.

The constitution of our association is hereby submitted. It has taken many hours of study and research with constant revisions to keep it up to date. If it will serve as a guide or an inspiration to those in search of such information in furthering industrial-arts education, I feel certain the members of our constitution committee, past and present, will feel amply repaid for their labors.

CONSTITUTION

Associated Guilds of Teachers of Industrial Arts of the City of New York

ARTICLE I

Section 1. Name

The name of this association shall be "The Associated Guilds of Teachers of Industrial Arts of the City of New York."

Section 2. Controlling Council

This association shall consist of 5 guilds, as follows: Bronx, Manhattan, Brooklyn, Queens, Richmond, and a controlling executive board.

Section 3. Purpose of Association

The purpose of this association shall be as follows: (*a*) The advancement of the professional welfare and the material interest of its members. (*b*) To stimulate interest and promote progress in manual and technical training. (*c*) to encourage social intercourse among the members of this association.

Section 4. Kinds of Members

There shall be four kinds of members; active, honorary, sustaining, and life.

Active members shall consist of teachers of shopwork in the public schools of the city of New York. They shall be entitled to vote and hold office if in good standing. Any teacher of shopwork in the New York schools in sympathy with the purposes of this association may become a member on payment of initiation fee of $3, one year's dues.

Honorary members shall consist of individuals interested in our aims and purposes who have been nominated at a regular meeting of any guild and approved upon by the general council. Such members shall be exempt from all dues and be entitled to all privileges of active members except the right to vote and hold office.

A sustaining member shall be a member who, by his efforts and interest is willing to promote greater improvements in the association.

Life membership: Any guild may bestow life membership to a retiring member of its guild, if the member to be honored is in good standing.

ARTICLE II — *Guilds*

Section 1.

a) Guild Officers: The officers of the guilds shall consist of president, vice-president, corresponding secretary, recording secretary, treasurer, and an executive committee, consisting of president, vice-president and one other member (usually past president), and legislative representative.

b) Election of Officers: The election of these officers shall take place at the regular guild meeting in June by a majority vote.

c) Nomination: Guild officers shall be nominated from the floor and preferably the meeting before election.

d) Term of Office: Guild officers shall serve for one or more years, preferably not more than two, as per will of the guild.

Section 2. Duties (Officers):

a) The president of each guild shall preside at all meetings and shall represent the guild as member of the general council. He shall

also appoint all guild committees and act as ex officio on all committees.

b) The vice-president shall preside in the absence of the president. He shall direct the activities of the administration committee and that on publicity. He receives all complaints.

c) The recording secretary shall keep a record of the guild membership. He shall place in the fore part of each minute book an accepted standard form of "Secretarial Procedure." He shall provide the president and vice-president with a list of the guild officers and committees.

d) The corresponding secretary shall receive all correspondence and answer same in the name of the guild. He is to make arrangements for the meetings and notify the members sufficiently in advance of each meeting.

e) The treasurer shall keep, receive, and administer all moneys belonging to the guild and keep all records of all receipts and disbursements. He receives all dues from members and will duly credit them. He will make a semiannual adjustment with the general council treasurer and keep receipts and records of each transaction. He will deposit guild funds in a bank, passbook to be drawn in the name of the guild and contain signatures of both the president and treasurer. Bank to be notified of same. The adjustments to the general council shall be March and October.

Section 3.

a) Quorum: Six members shall constitute a quorum at any guild meeting.

b) *Meetings:* Meetings must be held at least once a month except July and August or at the call of the request of six members.

ARTICLE III — *Executive Council*

Section 1.

a) Council Roster: The executive council shall consist of 21 members of the association drawn from the guilds in the following manner: each guild shall supply 4 members, except the guild related to the council past president which shall be 5 members. They shall be as follows: president, vice-president, past president, chairman of legislative committee.

b) Officers: The officers of this executive board shall consist of a president, vice-president, treasurer, recording secretary, corresponding secretary. Legislative and joint teachers representative, 2 members and 2 alternates. Shop and trade teachers' representatives, 3 members. Teacher's council representatives, 2 members, past president.

c) Election of Officers: All officers are to be elected by the members of this council but the president shall be elected in regular rotation of borough guilds in the following order: Manhattan, Queens, Brooklyn, Richmond, and Bronx. Any borough guild may yield its turn to any other borough guild without disturbing rotation.

d) Month of Election: The election of officers of this council shall be in September and by a majority vote.

Section 2.

a) Meetings: Executive council meetings shall be held once a month except for the months of July and August.

b) Special Meetings: Special meeting may be called by the president upon the petition of 5 members.

c) Nominations Election: The officers of this council shall be nominated from the floor and elected by a majority of the executive council. See section 1a.

Executive council of the Associated Guilds Teachers of Industrial Arts of the City of New York

Left to right, seated: Louis Weiner, Charles G. Fischer, Joseph Cox, Stanley Weber, Fred Dixon, Fred Berrjan, Martin Linkh, John Hurley, and President Louis Krassner

Left to right, standing: Abraham Gendel, Walter Lockwood, Basile Zito, Charles Thomas, and William Blair

d) Quorum: A quorum shall consist of 7 members from at least 4 different guilds.

ARTICLE IV

Section 1. Amendments:

Amendments to the constitution or bylaws may be proposed at any meeting of the council but shall not be acted upon until the next meeting or a special meeting for that purpose and a notice of the meeting shall contain the proposed amendment. If passed upon by a two-thirds vote it shall be submitted to the guilds for their consideration; whereupon it shall be brought back to the executive council for final adoption by a two-thirds vote.

BYLAWS

ARTICLE I — Guilds

Section 1.

a) Order of Business: The order of business at any meeting of the guilds shall be as follows:

1. Roll call
2. Reading of minutes of the previous meeting
3. Reading of report of executive council meeting
4. Report of officers except treasurer
5. Report of standing committees
6. Report of special committees
7. Communications and bills
8. Election of new members
9. Election of officers
10. Old or unfinished business
11. New business
12. Treasurer's report
13. Educational or social program
14. Adjournment

b) Guest Speakers: The president of the guilds shall be at liberty to invite as guest, those distinguished in the profession, whom it is desired to have discuss subjects of interest to the guild members.

ARTICLE II

Section 1. Standing Committees:

The standing committees shall be as follows: (1) program, (2) publicity, (3) administrative, (4) grievance, (5) supplies, (6) annual entertainment, (7) annual report.

Section 2. Duties:

a) Program — it shall be the duty of this committee to formulate the program of a meeting at least one month in advance of a stated meeting and forward outline of same to the publicity committee in time for publication. It shall provide the secretary with same early enough for ample time for notification to the members.

b) Publicity — it shall be the duty of this committee to keep the name of the association and its endeavors before the public and school authorities, to send notices of meetings and topics discussed to various newspapers and magazines. It shall co-operate with the program committee so that premeeting publicity can be conducted.

c) Grievance — this committee shall receive in writing all complaints of the guild members relative to their profession; it shall be the duty of this committee to reply to a complaint and furnish all possible information to the complainant, also to keep a record of same for future reference by filing it with the secretary and when necessary recommend it to the guild or executive council, in writing, for their action.

d) Administrative — this committee shall consider all matters of educational policy affecting the corps; it shall consult with the school authorities when necessary and shall file a report of same with Guild secretary and executive council.

e) Supplies — this committee shall receive all suggestions relative to supplies involved in the improvement of shopwork. It shall consider same and make such recommendations to the executive council.

f) Annual Entertainment — this committee shall serve as per pleasure of the guild.

g) Annual Report — it shall be the duty of this committee to obtain from the guild secretary all necessary data for an annual report, and to supply each member with a copy of same by the September meeting.

ARTICLE III

Section 1.

a) Dues: Dues shall be $3 per annum, payable to the guild treasurer. Extra assessments may be called for with the approval of the majority vote of the guild. New members shall pay their dues at or before the meeting of their election.

b) Date Dues Due: Dues shall be payable at September and February meetings.

Section 2. Arrear Members

A member six months in arrears shall be notified by the guild treasurer. When one year in arrears his name shall be dropped from the roll.

Section 3. Reinstatement

A member dropped from the roll may be restored automatically upon payment of his dues to date.

Section 4. Transfers

Guild membership shall be optional by transfer. New applications should be made in the borough guild in which he teaches.

ARTICLE IV

Resolutions: All resolutions or actions of general interest to all teachers of shopwork originated at any guild meeting must be sanctioned by the executive council before adoption.

ARTICLE V

Suspension of Bylaws: The bylaws may be suspended at any regular meeting by a two-thirds vote of the members present.

ARTICLE I — *Executive Council*

Section 1.

a) Order of Business: The order of business at any meeting of the council shall be as follows:

1. Roll Call
2. Reading of minutes of previous meeting
3. Reading of report of guilds
4. Report of officers except treasurer
5. Report of standing committees
6. Report of special committees
7. Communications and bills
8. Election of new members
9. Election of officers
10. Old or unfinished business
11. New business
12. Treasurer's report
13. Educational or social program
14. Adjournment

b) Guest Speakers: The president of the council shall be at liberty to invite as guest, those distinguished in the profession, whom it is desired to have discuss subjects of interest to the members.

ARTICLE II — *Duties (Officers)*

Section 1.

a) *Change:* The *President.* He shall preside at all meetings and act as ex-officio member of all committees and have general supervision of the interest of the executive council. He shall authorize the payment of all bills of the executive council; he shall appoint all committees except those stipulated in the bylaws; he shall cast a vote on tentative motions in case of a tie; he shall submit a plan of his meetings for the year at the October meeting; he shall be alert as to what constitutes a quorum for a meeting (7 members, 4 of which must be from different guilds); also the requirements to amend the constitution and bylaws; he shall be alert to unexpected visitors infringing on the meeting time; he shall introduce new members; he shall file, soon after taking office, his outline for the advancement of the association with the program committee; he shall deliver a report upon the completion of his term; he shall extend to the new incumbent such courtesies as are commensurate with the office. He shall visit a meeting of each guild at least once a year; he shall insist that each guild president file with the council recording secretary, a list of their council members with addresses at the close of their June meeting.

b) The vice-president shall preside and perform the duties of the president in his absence. He shall also act as receiver of all complaints. He shall direct the activities on publicity. He shall sit with the president and assist on all parliamentary matters and serve as chairman of the administrative committee.

c) The past president shall act as a consultant to the president.

d) The recording secretary shall keep the minutes of every meeting and present them at each succeeding meeting. He shall keep on file all guild and committee reports. He shall serve as chairman of the annual report committee. He shall provide the incumbent president with a list of the new council at the September meeting. He shall index subjects on file so that they may be referred to council quickly.

e) The corresponding secretary shall receive all correspondence and answer same in the name of the council at the direction of its members. He shall make arrangements for all meetings and notify members of each meeting. He shall be custodian of all materials of the council and list same. He shall also serve on the publicity committee.

f) The treasurer shall be the custodian of the funds of this council. He receives all moneys due the council and shall make adjustments with guild treasurers semiannually, he shall deposit all funds in a bank with the signature of the chairman and treasurer. He shall keep a record of all receipts and disbursements for all moneys expended. He shall pay all bills of the executive council when authorized by the attestment of the chairman and financial secretary and file a report annually at the June meeting to the recording secretary and guild presidents.

g) The legislative and joint teacher committee representatives shall co-ordinate their duties and keep the members of the executive council and guild members informed of all legislation of which they can obtain knowledge, which may be pending in the State Legislature in Albany, in the city government or in the federal Congress that may have effect or bearing on the shop teachers of the city of New York. They shall attend sessions of any of the above bureaus of government and act as our official representative when directed to do so by the various guilds through their representatives on the executive board. When in attendance at any of the sessions or meetings of the afore-mentioned bureaus of government, his traveling and living expenses shall be paid for by all the guilds combined, through a special assessment levied on each guild according to the number of members listed on each guild's roster of members. They shall act as the representatives from our association to the joint committee of teachers organizations. They shall attend all meetings of the joint committee and submit a report in writing at the following meeting of the executive council.

h) Teacher council representatives shall act as the representatives from the association to the teachers council. They shall attend all meetings of the teachers council and submit a report at the following meeting of the council.

i) Shop and trade teacher guild representatives shall act as representatives from the executive council to the shop and trade teachers association meeting. They shall submit a report of same at the following meeting of this council.

Duties (Committees)

Section 2.

a) A standing committee may be authorized by a majority vote of the council.

b) The following standing committees are authorized: (1) administrative, (2) materials and supplies, (3) welfare, (4) annual entertainment, (5) annual report, (6) program, (7) educational, (8) pension, (9) auditing, (10) bylaw, (11) publicity, (12) membership, (13) steward.

c) It shall be the duty of member making a report to do so in writing and supply the recording secretary with same.

d) *Administrative:* this committee shall consist of the guild presidents, with council vice-president as chairman and it shall consider all educational policy affecting the association. It shall confer with the school authorities when necessary. It shall be the duty of this committee to receive and act upon all complaints, also to file a written report of same with the recording secretary.

e) *The Supply Committee:* This committee shall consist of 4 members and shall be appointed by the president. It shall receive all suggestions relative to supplies involved in our work. It shall consider same and make such recommendations to the school authorities as it deems advisable.

f) *Welfare Committee:* It shall be the duty of this committee to report by phone to the president of this council as soon as possible the illness or death of any member of the association. It shall report resignations, retirements, promotions, and new members to this council in writing. It shall compile a history of each council member and file same with the recording secretary. It shall consider the plight of any member in financial, work, or health distress and endeavor to help him, also, if successful, try to obtain a statement from that member of his gratitude. All guild presidents shall serve on this committee.

g) *Annual Entertainment Committee:* This committee shall consist of 5 members appointed by the president. Also: This committee will secure from the membership committee a list of all new members and they shall be added to the "Guests" on such occasions.

h) *Annual Report Committee:* This committee shall consist of recording secretary and the chairman of each committee. It shall be the duty of this committee to prepare a report of transactions of this council for the present year and submit same to the council at the September meeting. All facts and information relative to this report shall be obtained from the *secretaries.* This report, when approved by the council, shall be filed with the *recording secretary* and a copy of same turned over to the publicity committee for their distribution to each borough guild and others that the council deem wise.

i) *Program committee:* It shall be the duty of this committee to provide a far-reaching program for this council and in forming this program may be guided by the following:

(1) The president's proposal for advancement of the association. (2) Set up a scheme for enriching the treasury (such as a Christmas sale of teacher-made craft, publish a book on our work). (3) Set up a live exhibit of our work. (4) Set up a list of the outstanding shops and their features. (5) Set up a file (with description) of teaching aids. (6) Establish a group of qualified teachers to scout and coach candidates for examinations in industrial arts. (7) Secure an association emblem. (8) Secure two songs, one serious and one joyous. (9) This committee shall be appointed by the president who will use his own discretion regarding the size of the committee.

j) *Educational Committee:* This committee shall consist of 5 members appointed by the duty of this committee to contact and list the name, address, and subject of noted men and women and industry representatives that in their judgment would be of interest as speakers or entertainers at guild or council meetings, also to file that information with the corresponding secretary. It shall also be the duty of this committee to keep this council informed through the corresponding secretary on new projects, books, devices, and teaching aids.

k) *Pension Committee:* This committee shall consist of all guild presidents. It shall be the duty of this committee to report facts from the board of retirement relative to pensions. Each committeeman shall receive for his guild from the council one subscription of pension publication. Each member of this committee shall obtain a copy of the "Teacher's Retirement System of the City of New York."

l) *Auditing Committee:* This committee shall consist of all guild presidents. It shall be the duty of this committee to file its report with the recording secretary at the October and March meetings; and that report shall indicate that the per capita dues have or have not been paid to the treasurer. It shall audit the accounts of the treasurer at the May meeting so that he may make his report in June.

m) *By-Law Committee:* This committee shall consist of past president, vice-president, and recording secretary. It shall be the duty of this committee to keep a record of all amendments to the constitution and bylaws with the date of such. It shall provide all members of the association with copies of same through the guild presidents. When proposed amendments are made it shall provide all members of the council with a copy of the proposal.

n) *Publicity Committee:* The vice-president and each guild executive chairman. The aims of this committee shall be to keep the name of the association and its work before the public and school authorities. They shall send notices of meetings and topics discussed to the various publications. They may organize an association pamphlet and see to its distribution to all school officials. The committee shall also handle all official printing of the association.

o) *Membership Committee:* This committee shall consist of 5 members, one from each guild and shall be appointed by the president. Its duties shall be, to please a new member, to keep the recording secretary informed of members — new, dropped, retired, deceased, honorary, sustaining, and Life; also the total membership. It shall secure from the publicity committee for each new member such literature and teaching aids as they may have.

p) *Steward Committee:* This committee shall consist of past president, treasurer, vice-president. It shall be the duty of this committee to secure and manage meeting room affairs, it shall ascertain from the council the amount allowed for this purpose and supervise the service of same.

ARTICLE III

Section 1.

a) Income: The income of the executive council shall be by per capita share from all the guilds at the rate of 50 cents per member. Extra assessments may be called for with the approval of the majority vote of the executive council.

b) Date Dues Due: The per capita share to the executive Council shall be due the first regular meeting in September and February.

ARTICLE IV

Resolutions or Actions: All resolutions or actions of general interest to all teachers of shopwork originated at any guild meeting must be sanctioned by the executive council before adoption.

ARTICLE V

Vote Value: Each executive council member shall have one vote. One member may vote for an absent member.

ARTICLE VI

Suspension of Bylaws: The bylaws may be suspended at any regular meeting by a two-thirds vote of the members present.

ARTICLE VII

Adoption: This constitution and bylaws shall take effect as amended September 10, 1945.

(*Approved by all guilds*)

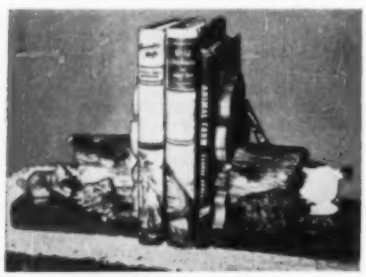
Reference for rules of procedure: "Cushing's Manual of Parliamentary Practice."

Problems and Projects

DOG AND RABBIT BOOK ENDS

D. C. MARSHALL
Woodwork Instructor
High School
Manhattan, Kans.

Book ends can be amusing as well as useful if they are designed for that purpose. This pair, showing the dog trying to get into the hollow log after the rabbit, while it sits out at the other end watching to see if he will succeed, will add an interesting item for the den or library. The materials needed are so small and the construction so simple, they come in the class of a one-evening project.



Dog and rabbit book ends

The first step in construction is to saw out the bases and round the corners. Then the pattern for the uprights is laid out on a piece of plywood and both are sawed out at the same time on the jig saw.

The hollow log is made by turning it on the lathe. Then the under side is flattened with a plane. The ¼-in. holes in the ends are bored with an expansive bit and then the outside is roughed up to resemble bark by taking a wood rasp and using it, draw file fashion, over the outside surface. The ends of the log are chipped and roughened on the band saw so that they look as if they had decayed. Several holes are bored at an angle and short pieces of tree limbs are inserted in these for branches on the log. Around the base of each limb, a little plastic wood is built up to round out the joint where the limb joins the log.

The profiles of the dog and rabbit are laid out on blocks of white pine and sawed out on the jig saw. A carving knife and one or two carving chisels will help to shape them up. Since the dog is in the log, it is only necessary to make a half dog. After carving, the dog and rabbit should be sanded before painting.

Draw filing the log with a wood rasp to give it the appearance of bark

(*Note: After removing index, treat pages 412 and 417 as consecutive pages.*)

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

VOLUME 38—1949

THE BRUCE PUBLISHING COMPANY

New York MILWAUKEE Chicago

Aeronautics
Aeronautics, William E. Nagel, 136
Aircraft Sources of Electrical Power Test, Walter M. Gordon and William C. Ford, 67
Aircraft Starters and Motors Test, Walter M. Gordon and William C. Ford, 70
Aviation Training in the Small High School, Samuel Nicholas, 121
Syllabus in Aircraft Drafting, William H. Bowers, 117

Air Conditioning
High School Course in Air Conditioning, A, V. L. Sherman, 361

Apprenticeship
Developing Apprenticeship-Training Curriculums, J. Douglas Wilson, 219

Auto Mechanics
Basic Vocabulary for Related Spelling in a Trade Training Program, A, Ernest H. Suerken, 354
Elementary Auto Mechanics, Frank B. Miller, 35, 54A (Mar.), 218, 252, 386

Biography
Mr. McNamee Retires, 240
Some Leaders in Industrial Education, William T. Bawden, 9, 53, 189, 227, 263, 310, 357, 391

PAGES IN EACH ISSUE

January	1– 40
February	41– 80
March	81–136
April	137–180
May	181–218
June	219–256
September	257–304
October	305–348
November	349–388
December	389–428

Boats
"Hunter and Fisherman" Skiff, The, Francis E. Joas, 365

Bruce's School Shop Annual
Bench Metal Outline, Ralph E. Stucki, 119
Color Rendering, George A. Soderberg, 106
Course in School Shop Planning, A, DeWitt Hunt, 96
Escola Tecnica de Aviacao, Alan R. Pawelek, 103
High School Building Trades Projects, Walter E. Durbahn, 107
Industrial Education at the Agricultural and Mechanical College of Texas, Chris H. Groneman, 81
Kenosha Builds a New Vocational School, H. M. Clark, 100
Make Your Own "Vapor-Type" Brush Keeper, E. Kurath, 134
Planning School Shops, Thomas A. Hippaka, 91
Practical Shop Layouts for Areas and Work Stations, George A. Willoughby, 88
Present Position of Industrial Arts in Canadian Schools, The, Lindley H. Bennett, 125
Scottish Woollen Technical College, The, William Gardner, 101
Small Schools Can Offer a Practical Course in Carpentry, Harold C. Matson, 112
Syllabus in Aircraft Drafting, William H. Bowers, 117
Tool Storage, E. R. Glazener, 98

Ceramics and Plastics
Barbeque Fireplace, J. Edgar Ray, 213
Expanding Curricula With Industrial-Arts Plastic Course, Robert Lloyd Cantor, 359
Letter Opener, Thomas A. Harris, 132
Letter Rack, P. S. Burns, 161
Nut or Candy Trays, P. S. Burns, 201
Plastic Boxes, Percy W. Blandford, 244
Plastic Checkerboard, The, John Emmel, 423
Plastic Door Knocker, Chris H. Groneman, 418
Plastic Mirror With Ornamental Back, Simon S. Palestrant, 165
Plastic in the Industrial-Arts Shop, Donald B. Greenwood, 316, 351
Plastic Tray, O. S. Harrison, 326

Plexiglas Flowers and Ornaments, George F. Henry and Ronald R. Bauer, 252
Polishing Plaster Models, Simon S. Palestrant, 218
Potter Begins the Casting Process, The, Elmer A. Morrow, 30
Test on Plastics, Robert Lloyd Cantor, 58

Clubs
Associated Guilds of Teachers of Industrial Arts, New York City, John Hurley, 409
Photography, Harry A. Goldstein, 212
Selling the Graphic Arts, John M. Fontana, 156

Co-operative, Distributive, and Consumer Education
Aiding the Diversified Occupations Student to Adjust to His Job, William P. Green and Benjamin J. Novak, 154, 195
Consumer Education in Industrial-Arts Architectural Drawing, Donald Maley, 11
Use of Tests in Retail Education, The, Donald K. Beckley, 44

Course Outlines
Aviation Training in the Small High School, Samuel Nicholas, 121
Bench Metal Outline, Ralph E. Stucki, 119
Course in Art Metalcraft, A, Amos G. Williams, 118
Course Outline for Related Subjects in Plumbing and Steam Fitting, Carlton Dwight, 113
Developing Apprenticeship-Training Curriculums, J. Douglas Wilson, 219
Operation Units in Printing, Maurice J. Nelson, 426
Plastics in the Industrial-Arts Shop, Donald B. Greenwood, 316, 351

Design and Drafting (Architectural and Mechanical)
Adventure in Architectural Drafting, An, Anthony Calandro, 280
Aid for Reading Data, An, R. E. Murray, 176
Blueprint Machine, H. R. L. Chellman, 174
Christmas Cards as a Project, Edward Gorab, 26
Consumer Education in Industrial-Arts Architectural Drawing, Donald Maley, 11
Drawing Board Support for the Woodshop, Carlton H. Shindler, 281
Instrument Cabinet for the Drafting Room, F. N. Newton, Jr., 159
Lesson Sheet on Dimensioning, A, K. H. Cairr, 14A (Jan.)
Machinist's Vise, A, D. E. Kellogg, 164
Number, Letter, and Fractional Drill Sizes, and Their Decimal Equivalents, Denham R. Griffin, 380
Placement of Mechanical Drawing Students in Industry, F. N. Newton, Jr., 254
Syllabus in Aircraft Drafting, William H. Bowers, 117
Tests in the General Shop, C. H. Niemann, 62
Turned Ink-Bottle Holder, J. H. McCloskey, 344
Two Dimension Plate Centering, B. Alfred Cox, 174
Week-End Cabin, A, J. Edgar Ray, 278
Woodworking Lathe, Otto Northquest and Herbert Bell, 73

Editorials
Adult Education, 48
Aging and the Handicapped Worker, The, 362
Annual Conventions Show Signs of Strength, 230
Another Five Years, 8
AVA Convention at Atlantic City, The, 398
Beginning of the School Year, The, 270
Cancer, 152
End of the First Semester, The, 48
Every School Shop Needs an Eye Program, 362
Good Shop Demonstration, 152
How Safe Is Your Shop Against Fires?, 362
Human Element, The, 230
Industrial Innovations of Interest to Shop Teachers, 230
Looking Forward, 398
Make America Invulnerable, 270
Occupational Adjustment, 270
Requisition Time, 194
Scientific Advances Not Unmixed Blessings, 8
Seasonal Project, A, 398
Student's Vacation, The, 194
Teacher's Vacation, The, 194
This Testing Number, 48
Volume 38 of Industrial Arts and Vocational Education, 398
Welding and Fire Hazards, 8
Why Is the World Not at Peace?, 152
William George Bruce Dies at 93, 318

Electricity
Aid for Teaching Magnetism, Charles E. Kolb, 209
Aircraft Sources of Electrical Power Test, Walter M. Gordon and William C. Ford, 67
Aircraft Starters and Motors Test, Walter M. Gordon and William C. Ford, 70
Basic Vocabulary for Related Spelling in a Trade Training Program, A, Ernest H. Suerken, 354
Economy Plug-In Devices, Elmer C. O'Donnell, 175
Educational Electronics, John N. Willmott, Robert L. Whittle, and Thomas D. Miner, 340
Electrical Achievement Test, William Kavanaugh, 59
Electrical Installation and Practice — An Instruction Sheet, Elmer C. O'Donnell, 37
Equipment Made From Salvaged Radio Power Supplies, Wm. R. Stocking, Jr., 291
Gold Electroplating Displaced by New Rolling Process, 331
Planter Lamp, L. Bryce Hardeman, 27
Radio Demonstration Board, Everett R. Passoja, 377
Selsyn Motor Operation of Film-Strip Projectors, Maurice E. Trusal and Don D. Hennigan, 329
Toy Electric Motor and Countershaft, Joseph J. Lukowitz, 320

General Shop and Home Mechanics
Cutting Bottles and Jars, Jesse E. Rathbun, 218
Decanters, Alfred Wieda, 327
Handy Miniature Spirit Level, I. M. Fenn, 290
Shoe Repair in Rural Areas, Everett A. Grant, 279

Glossaries and Spelling Lists
Basic Vocabulary for Related Spelling in a Trade Training Program, A, Ernst H. Suerken, 354
Glossary of Lumber Trade Terms, Louis Barocci, 250

Guidance
Aiding the Diversified Occupations Student to Adjust to His Job, William P. Green and Benjamin J. Novak, 154, 195
Guidance in the Industrial-Arts Shop, Alice Helen Frankel, 150
Placement of Mechanical Drawing Students in Industry, F. N. Newton, Jr., 254
Teacher-Counselor Relationships, Harry A. Goldstein, 265

Hobbies
Hobby Crafts for the U. S. Navy, W. T. Baxter, 15
Living in a Dynamic World, Paul N. Wenger, 198

Home Shop
Starting a Home Workshop, Joseph J. Littrell, 39

Industrial Arts
Associated Guilds of Teachers of Industrial Arts, New York City, John Hurley, 409
Background and Outlook in Industrial Education, H. H. London, 257
Call to Arms for Members of Industrial-Arts Clubs, A, John Hurley, 360
Cars of Tomorrow by Boys of Today, Bernard W. Crandell, 285
Establishing and Maintaining Relationships With Management, Labor, and the Public, S. Lewis Land, 305
Hobby Crafts for the U. S. Navy, W. T. Baxter, 15
Improving the Industrial Arts, Deyo B. Fox, 259
Industrial Arts and Vocational Education in Atlantic City, Lenta D. Gold, 389
Industrial Education at the Agricultural and Mechanical College of Texas, Chris H. Groneman, 81
Industrial Education for General School Administrators, William E. Caswell, 184
Let's Get Critical, Vernon D. Stapleford, 394
Living in a Dynamic World, Paul N. Wenger, 198
Manual Arts Press Changes Name, The, Paul Van Winkle, 426
Present Position of Industrial Arts in Canadian Schools, The, Lindley H. Bennett, 125, 146
Proceed According to Plan, Donald B. Greenwood, 271
School-Shop Toolroom, The, E. LeRoy Longley, 268
Some Leaders in Industrial Education, William T. Bawden, 9, 53, 189, 227, 263, 310, 357, 391

Instruction Sheets (Operations, Processes, and Assignments)
Educational Electronics, John N. Willmott, Robert L. Whittle, and Thomas D. Miner, 340

Leatherwork
Comprehensive Leatherworking Test, Albert B. Moorhead, 68
Leathercraft, W. D. Chatfield, 207
Selected Projects in Leather Carving, Welcome E. Wright, 245

Machine Shop
Constructing a Small Drill Press in the School Shop, C. W. Illingworth, 381
Efficient Use of Cutting Fluids, The, R. M. Dyke, 78
File Rack, Harry F. Mergler, 37
Good Engine Lathe Centers, Edward G. Senkewitz, 329
Hand and Machine Die Holder, Ira H. Johnson, 173
Jig for Measuring Taper Per Inch on the Lathe, H. Moore, 417
Machinist's Vise, A, D. E. Kellogg, 164
Number, Letter, and Fractional Drill Sizes, and Their Decimal Equivalents, Denham R. Griffin, 380
Paperweight, R. Paul Lightle, 251
Shop Kink for Checking Tapers, Ralph Popkin, 384
Stock Rack for Metal and Machine Shops, Norman Peterson, 176
Task Assignment Wheel, Alan L. Morehouse, 204
Three Simple Machine-Shop Projects, E. R. Glazener, 328
Tungsten Carbide Tools in the School Shop, Ralph B. Popkin, 213
Why Not Discard Certain Shop Terms?, Lorenzo Mendicino, 25
Woodworking Lathe, Otto Northquest and Herbert Bell, 73

Metalwork
Aluminum Bread Tray, Simon S. Palestrant, 337
Aluminum Cigarette Box, Homer C. Rose, 284
Aluminum Jewel Box, Emerson C. Best, 29
Beach Pail and Shovel, Vincent P. Conners, 338
Bench Metal Outline, Ralph E. Stucki, 119
Book End, Charles L. Frank, 72
Bow-Type Saws, D. C. Marshall, 423
Bread Pan, Charles L. Frank, 216
Colonial Candleholders, Augustine J. Brezina, 132
Course in Art Metalcraft, A, Amos G. Williams, 118
Cutting Bottles and Jars, Jesse E. Rathbun, 218
Decanters, Alfred Wieda, 327
Desk Name Plate, E. Clay Venable, 327
Differentiating Between Magnesium and Aluminum, Louie S. Taylor, 293
Electric Soldering-Copper Holder, Clinton R. Hillyard, 244
Four Multiple-Purpose Spinning Chucks, James O. Reynolds, 333
Heavy Duty Tablet Arm Chair, A, George H. Parkes, 170
Indian Silversmithing, Ben Hunt, 33, 76, 130, 162, 206, 249, 294, 384, 419
Landing Net or Gaff, Otto A. Northquest and Donald J. Michalowski, 377
Letter Opener, Thomas A. Harris, 132
Letter Opener, Homer C. Rose, 24
Modern Candlesticks in Copper, John H. Pikus, 204
Modern in Soldering, The, A. F. Bick, 291
Modern Iron Furniture, Carson F. Thomson, 180
Mug, Clifford L. Yard and Henry J. Kauffman, 178
Number, Letter, and Fractional Drill Sizes, and Their Decimal Equivalents, Denham R. Griffin, 380
Paperweight, R. Paul Lightle, 251
Photo Stand, Homer C. Rose, 336
Planter Lamp, L. Bryce Hardeman, 27
Planter Lamp, Donald Schrei, 378
Revolving Seesaw, Howard R. Junker, 201
Rod Bracket, Wm. K. Nevard, 203
Sheet-Metal Layout, Howard L. Bean, 422
Simple Compass in Modern Design, Augustine J. Brezina, 71
Simple New England Wall Sconces, Vincent P. Conners, 159
Small Brass Lamp, Homer C. Rose, 212
Smoker's Stand for a Desk Set, Franklin H. Gottshall, 129
Spurs, Clifford E. Boswell, 210
Stock Rack for Metal and Machine Shops, Norman Peterson, 176
Toy Electric Motor and Countershaft, Joseph J. Lukowitz, 320
Viking Ship Book Ends, Simon S. Palestrant, 242
Welding Projects, H. W. Humphrey, 243
Wood and Metal Shelf, Harry S. Baldwin, 12A (Jan.)

Method
Methods of Teaching Occupational Subjects, C. A. Felker, 40, 51

Photography
Photography, Harry A. Goldstein, 212

Playlets and Stagecraft
Living in a Dynamic World, Paul N. Wenger, 198
School Exhibits, E. W. Osgood, 364

Poems
Remembrance — Decoration Day, Lindley H. Bennett, 337
Selected Service, Lindley H. Bennett, 239

Printing
Basic Styles in Popular Type Faces, R. Randolph Karch, 170
Basic Vocabulary for Related Spelling in a Trade Training Program, A, Ernst H. Suerken, 354
Handbook for Learners of Trade Printing, B. H. Thomas, 38A (Mar.)
Operation Units in Printing, Maurice J. Nelson, 426
Printing Teacher and the Graphic Arts, The, David P. Barnard, 399
Printing Teacher and His Aims, The, George J. Mills, 225
Progress Scale Thermometer — A Printing Job, William Fitzgerald, 208
Selling the Graphic Arts, John M. Fontana, 156
What the Supervisor of Printing Should Expect of His Staff, Leroy Brewington, 144

Public Relations
Establishing and Maintaining Relationships With Management, Labor, and the Public, S. Lewis Land, 305
Public Relations and Vocational Education, Lynn Ogden, Kurt Schneider, and Earl H. Kimball, 274

Questions and Answers
Adequacy of Industrial-Arts Teacher Training, 26A (Oct.)
Courses on Jewelry Making, 26A (Oct.)
Finish for Wood Bowls, Tumblers, and Goblets, 24A (Nov.)
Finished Basswood, 20A (Jan.)
Limed Oak or Rubbed Oak Finish, 27A (Oct.)
Matching a Cherry Finish on Various Kinds of Wood, 38A (Mar.)
Pen Sockets, 28A (Jan.)
Teaching and Supervising Industrial Arts, 20A (Jan.)

Radio
Educational Electronics, John N. Willmott, Robert L. Whittle, and Thomas D. Miner, 340
Radio Demonstration Board, Everett R. Passoja, 377

Related Work
Aeronautics, William E. Nagel, 136
Basic Vocabulary for Related Spelling in a Trade Training Program, A, Ernst H. Suerken, 354
Cabinetmaking Test — Related Work, Second Term, W. H. Bowers, 56
Course Outline for Related Subjects in Plumbing and Steam Fitting, Carlton Dwight, 113
Differentiating Between Magnesium and Aluminum, Louie S. Taylor, 293
English for Trade and Vocational Schools, J. Allen Morris, 22, 217, 248, 385, 407
High School Course in Air Conditioning, A, V. L. Sherman, 361
Indium, 284
Interviewing for a Position, Charles F. Wells, 363
Lithium, 247
Machinist's Hands, The, Waldemar Schweisheimer, 276
Make Related Mathematics Related, Clayton E. Buell, 319
Molybdenum, 296
Related Training for Veterans in On-Job Training Programs, Harry S. Belman, 13
Selenium, 258
Silicon, 286
Some Factors in the Teaching of Shop Mathematics, W. H. Edwards, 178
Square-Root Spiral Curve, John H. Clark, Jr., 301
Technical Institutes, Ralph E. Pickett, 137
Tungsten Carbide Tools in the School Shop, Ralph B. Popkin, 213
Why Not Discard Certain Shop Terms?, Lorenzo Mendicino, 25

Research Studies
Printing Teacher and the Graphic Arts, The, David P. Barnard, 399

Safety
Better Lighting Reduces Night Traffic Accidents, Ed C. Powers, 38
Here's How to Stop Your Automobile Safely, 26A (Feb.)
Recognizing the Value of Driver Education, Herbert J. Stack, 275
School Shop Safety in the Teacher Education Program, G. Baysinger, 5
Solvent Illness, 169

School and Shop Utilities
Aid for Reading Data, An, R. E. Murray, 176
Blueprint Machine, H. R. L. Chellman, 174
Combination Bench Hook and Shoot Board, Harrison Neustadt, 296
Drawing Board Support for the Woodshop, Carlton H. Shindler, 281
Economy Plug-In Devices, Elmer C. O'Donnell, 175
Electric Soldering-Copper Holder, Clinton R. Hillyard, 244
File Rack, Harry F. Mergler, 37
Glue Table and Clamp Rack, Louis Barocci, 247
Good Engine Lathe Centers, Edward G. Senkewitz, 329
Gymnasium Scoreboard, R. Paul Lightle, 417
Hand and Machine Die Holder, Ira H. Johnson, 173
Heavy Duty Tablet Arm Chair, A, George H. Parkes, 170
Improved Coping-Saw Jig, Fred Finsterbach, 32
Instrument Cabinet for the Drafting Room, F. N. Newton, Jr., 159
Lathe Table With Accessory Cabinet, R. Paul Lightle, 387
Modern Teacher's Desk, Earl Kimball, 297
Selsyn Motor Operation of Film-Strip Projectors, Maurice E. Trusal and Don D. Hennigan, 329
Shop Kink for Checking Papers, Ralph Popkin, 384
Stock Rack for Metal and Machine Shops, Norman Peterson, 176
Tool for Fluting Dowels, David Janowitz, 135

Shop Kinks
Drawer Cabinet, E. A. Rerucha, 27
Improved Coping-Saw Jig, Fred Finsterbach, 32
Polishing Plaster Models, Simon S. Palestrant, 218

Shop Management
Let's Get Critical, Vernon D. Stapleford, 394
Shop Personnel Organization, Bruce J. Gammons, 273
Task Assignment Wheel, Alan L. Morehouse, 204

Shop Planning
Color Rendering, George A. Soderberg, 106
Course in School Shop Planning, A, DeWitt Hunt, 96
Hobby Crafts for the U. S. Navy, W. T. Baxter, 15
How Much Do You Know About Luminescence?, 200
Industrial Education at the Agricultural and Mechanical College of Texas, Chris H. Groneman, 81
Kenosha Builds a New Vocational School, H. M. Clark, 100
Less Light Required, 164
Planning School Shops, Thomas A. Hippaka, 91
Practical Shop Layouts for Areas and Work Stations, George A. Willoughby, 88
School-Shop Toolroom, The, E. LeRoy Longley, 268
Tool Storage, E. R. Glazener, 98

Sports, Games, Toys, Models, Camp Work, Archery
Gaff Hook, Arthur W. Tessmer, 131
Gymnasium Scoreboard, R. Paul Lightle, 417
Landing Net or Gaff, Otto A. Northquest and Donald J. Michalowski, 377
Plastic Checkerboard, The, John Emmel, 423

Supervision
Supervisor's Check List for Industrial Arts and Elementary Crafts, D. Arthur Bricker, 405
Teacher's View on Supervision, The, G. C. Henriksen, 406
Upgrading Vocational Teachers, Thomas Diamond, 197, 238, 261
What the Supervisor of Printing Should Expect of His Staff, Leroy Brewington, 144

Teacher Training
Analysis Technique, The, William J. Micheels, 349
Background and Outlook in Industrial Education, H. H. London, 257
Brief Training Course for Conference Leaders, A, F. Lyman Tibbitts, 234, 308, 396
Department Chairman and His Job, The, George H. Parkes, 181
Escola Tecnica de Aviacao, Alan R. Pawelek, 103
Improving the Industrial Arts, Deyo B. Fox, 259
Industrial-Arts Exhibit, The, James O. Reynolds, 237
Industrial Education for General School Administrators, William E. Caswell, 184
In-Service Development of Industrial-Arts Teachers, Chris H. Groneman, 186
Let's Publicize Our Work, 22A (Feb.)
Liberal and Vocational Education, Edward A. Fitzpatrick, 1
Proceed According to Plan, Donald B. Greenwood, 271
School Shop Safety in the Teacher Education Program, G. Baysinger, 5
Scottish Woollen Technical College, The, William Gardner, 101
Selecting an Institution for Graduate Study, William T. Bawden, 141
Selection, Preparation and Presentation of Subject Matter, Donald F. Hackett, 231, 266
Some Statements Prepared for the Vocational Teachers of Hesse, Germany, Homer J. Smith, 157, 191, 233
Technical Institutes, Ralph E. Pickett, 137
Upgrading Vocational Teachers, Thomas Diamond, 197, 238, 261
Workshop Held for Tulsa Industrial-Arts Teachers, M. J. Ruley, 136

Testing and Tests
Achievement Test in Mechanical Drawing — Grade X — A Midyear Test, Andrew G. Lofgren, 63
Aircraft Sources of Electrical Power Test, Walter M. Gordon and William C. Ford, 67
Aircraft Starters and Motor Test, Walter M. Gordon and William C. Ford, 70
Cabinetmaking Test — Related Work, Second Term, W. H. Bowers, 56
Checking the Student's Knowledge With the Camera, Thurston M. Rothrock, 19
Comprehensive Leatherworking Test, Albert B. Moorhead, 68
Electrical Achievement Test, William Kavanaugh, 59
Evaluation of Test Results, John A. Jarvis, 41
How to Improve Objective-Type Tests, J. T. Oldknow, 49
Method of Test Construction for Shop Subjects, A, M. O. Johnson, 47
Recording and Weighting Industrial-Arts Grades, John F. Friese, 223
Test on Plastics, Robert Lloyd Cantor, 58
Tests in the General Shop, C. H. Niemann, 62
Use of Tests in Retail Education, The, Donald K. Beckley, 44

Visual Aids (Illustrative Materials and Visual Aids)
Aid for Teaching Magnetism, Charles E. Kolb, 209
Industrial-Arts Exhibit, The, James O. Reynolds, 237
Model House, C. V. Stainsby, 424
Radio Demonstration Board, Everett R. Passoja, 377
Teaching Materials for Industrial Education, Chris H. Groneman, 128

Vocational Education
Escola Tecnica de Aviacao, Alan R. Pawelek, 103
Establishing and Maintaining Relationships With Management, Labor, and the Public, S. Lewis Land, 305
High School Building Trades Projects, Walter E. Durbahn, 107
Industrial Arts and Vocational Education in Atlantic City, Lentz D. Gold, 389
Industrial Education at the Agricultural and Mechanical College of Texas, Chris H. Groneman, 81
Industrial Education for General School Administrators, William E. Caswell, 184
Let's Get Critical, Vernon D. Stapleford, 394
Liberal and Vocational Education, Edward A. Fitzpatrick, 1
Methods of Teaching Occupational Subjects, C. A. Felker, 40, 51
Mr. McNamee Retires, 240
Present Position of Industrial Arts in Canadian Schools, The, Lindley H. Bennett, 125, 146
Public Relations and Vocational Education, Lynn Ogden, Kurt Schneider, and Earl H. Kimball, 274
School-Shop Toolroom, The, E. LeRoy Longley, 268
Small Schools Can Offer a Practical Course in Carpentry, Harold C. Matson, 112
Some Leaders in Industrial Education, William T. Bawden, 9, 53, 189, 227, 263, 310, 357, 391
Vocational Education for the Nonverbal Learner, Carlton Dwight, 314

Woodworking (Patternmaking, Turning, Cabinetmaking, Carpentry, Wood Finishing)
Baby Crib, A, R. E. Jennings, 25
Baby's Wardrobe, R. E. Jennings, 133
Basic Vocabulary for Related Spelling in a Trade Training Program, A, Ernst H. Suerken, 354
Bedside Stand, G. C. Henriksen, 254
Book Ends, H. D. Schultz, 39
Cabinetmaking Test — Related Work, Second Term, W. H. Bowers, 56
Cheese and Cracker Tray, Harry S. Baldwin, 169
Coffee Table, Franklin H. Gottshall, 282
Combination Bench Hook and Shoot Board, Harrison Neustadt, 296
Cutting Bottles and Jars, Jesse E. Rathbun, 218
Decanters, Alfred Wieda, 327
Dog and Rabbit Book Ends, D. C. Marshall, 412
Drawing Board Support for the Woodshop, Carlton H. Shindler, 281
End Table, E. R. Glazener, 302
File Rack, Harry F. Mergler, 37
Finishing Interior Walls, R. E. Murray, 206
Fruit Bowl, E. R. Glazener, 333
Fruit and Vegetable Bin, Louis Barocci, 205
Functional Bedroom Furniture, E. J. Rawson, 287
Gaff Hook, Arthur W. Tessmer, 131
Glossary of Lumber Trade Terms, Louis Barocci, 250
Glue Table and Clamp Rack, Louis Barocci, 247
Gymnasium Scoreboard, R. Paul Lightle, 417
High School Building Trades Projects, Walter E. Durbahn, 107
"Hunter and Fisherman" Skiff, The, Francis E. Joas, 365
Instrument Cabinet for the Drafting Room, F. N. Newton, Jr., 159
Laminated Fruit and Nut Bowl With Matching Candlesticks, John A. Larsen, 203
Lathe Table With Accessory Cabinet, R. Paul Lightle, 387
Machinist's Vise, A, D. E. Kellogg, 164
Magazine End Table, John H. Pikus, 72
Make Your Own "Vapor-Type" Brush Keeper, E. Kurath, 134
Memo Pad, Jay A. Borden, 210
Model House, C. V. Stainsby, 424
Modern Desk, A, Carlton Redmond, 420
Modern Teacher's Desk, Earl Kimball, 297
Personalized Tie or Belt Racks, Delmar W. Olson, 177
Picnic Table With Masonite Top, 300
Play Pen, R. E. Jennings, 71
Repairing Broken Jack Plane Bottoms, H. A. Allender, 25A (Feb.)
Sanding Block, E. A. Rerucha, 381
School Exhibits, E. W. Osgood, 364
Small Schools Can Offer a Practical Course in Carpentry, Harold C. Matson, 112
Stout Students Build a House, K. T. Olsen, 77
Tool for Fluting Dowels, David Janowitz, 135
Tricycle, M. J. Ruley, 345
Turned Ink-Bottle Holder, J. H. McCloskey, 344
Typewriter Table, C. F. Zaenglein, 339
Week-End Cabin, A, J. Edgar Ray, 278
Wood and Metal Shelf, Harry S. Baldwin, 12A (Jan.)
Wood Finishing Chart, Fred L. Griffin, 425
Woodworking Lathe, Otto Northquest and Herbert Bell, 73

INDEX OF AUTHORS

A

Allender, H. A., 25A (Feb.)

B

Baldwin, Harry S., 12A (Jan.), 169
Barnard, David P., 399
Barocci, Louis, 205, 247, 250
Bauer, Ronald R., 252
Bawden, William T., 9, 53, 141, 189, 227, 263, 310, 357, 391
Baxter, W. T., 15
Baysinger, G., 5
Bean, Howard L., 422
Beckley, Donald K., 44
Bell, Herbert, 73
Belman, Harry S., 13
Bennett, Lindley H., 125, 146, 237, 239
Best, Emerson C., 29
Bick, A. F., 291
Blandford, Percy W., 244
Borden, Jay A., 210
Boswell, Clifford E., 210
Bowers, W. H., 56, 117
Brewington, Leroy, 144
Brezina, Augustine J., 71, 132
Bricker, D. Arthur, 405
Buell, Clayton E., 319
Burns, P. S., 161, 201

C

Calandro, Anthony, 280
Cantor, Robert Lloyd, 58, 359
Caswell, William E., 184
Chatfield, W. D., 207
Chellman, H. R. L., 174
Clark, H. M., 100
Clark, John H., Jr., 301
Conners, Vincent P., 159, 338
Cox, B. Alfred, 174
Crandell, Bernard W., 285
Czirr, K. H., 14A (Jan.)

D

Diamond, Thomas, 197, 238, 261
Durbahn, Walter E., 107
Dwight, Carlton, 113, 314
Dyke, R. M., 78

E

Edwards, W. H., 178
Emmel, John, 423

F

Felker, C. A., 40, 51
Fenn, I. M., 290
Finsterbach, Fred, 32
Fitzgerald, William, 208
Fitzpatrick, Edward A., 1
Fontana, John M., 156
Ford, William C., 67, 70
Fox, Deyo B., 259
Frank, Charles L., 72, 216
Frankel, Alice Helen, 150
Friese, John F., 223

G

Gallik, William, 347
Gammons, Bruce J., 273
Gardner, William, 101
Glazener, E. R., 98, 302, 328, 333
Gold, Lentz D., 389
Goldstein, Harry A., 212, 265
Gorab, Edward, 26
Gordon, Walter M., 67, 70
Gottshall, Franklin H., 129, 282
Grant, Everett A., 279
Green, William P., 154, 195
Greenwood, Donald B., 271, 316, 351
Griffin, Denham R., 380
Griffin, Fred L., 425
Groneman, Chris H., 81, 128, 186, 418

H

Hackett, Donald F., 231, 266
Hardeman, L. Bryce, 27
Harris, Thomas A., 132
Harrison, O. S., 326
Hennigan, Don D., 329
Henriksen, G. C., 254, 406
Henry, George F., 252
Hillyard, Clinton R., 244
Hippaka, Thomas A., 91
Humphrey, H. W., 243
Hunt, Ben, 33, 76, 130, 162, 206, 249, 294, 384, 419
Hunt, DeWitt, 96
Hurley, John, 360, 409

I

Illingworth, C. W., 381

J

Janowitz, David, 135
Jarvis, John A., 41
Jennings, R. E., 25, 71, 133
Joas, Francis E., 365
Johnson, Ira H., 173
Johnson, M. O., 47
Junker, Howard R., 201

K

Karch, R. Randolph, 170
Kauffman, Henry J., 178
Kavanaugh, William, 59
Kellogg, D. E., 164
Kimball, Earl H., 274, 297
Kolb, Charles E., 209
Kurath, E., 134

L

Land, S. Lewis, 305
Larsen, John A., 203
Lightle, R. Paul, 251, 387, 417
Littrell, Joseph J., 39
Lofgren, Andrew G., 63
London, H. H., 257
Longley, E. LeRoy, 268
Lukowitz, Joseph J., 320

M

Maley, Donald, 11
Marshall, D. C., 417, 423
Matson, Harold C., 112
McCloskey, J. H., 344
Mendicino, Lorenzo, 25
Mergler, Harry F., 37
Michalowski, Donald J., 377
Micheels, William J., 349
Miller, Frank B., 35, 54A (Mar.), 218, 252, 386
Mills, George J., 225
Miner, Thomas D., 340
Moore, H., 417
Moorhead, Albert J., 68
Morehouse, Alan L., 204
Morris, J. Allen, 22, 217, 248, 385, 407
Morrow, Elmer A., 30
Murray, R. E., 176, 206

N

Nagel, William E., 136
Nelson, Maurice J., 426
Neustadt, Harrison, 296
Nevard, Wm. K., 203
Newton, F. N., Jr., 159, 254
Nicholas, Samuel, 121
Niemann, C. H., 62
Northquest, Otto, 73, 377
Novak, Benjamin J., 154, 195

O

O'Donnell, Elmer C., 37, 175
Ogden, Lynn, 274
Oldknow, J. T., 49
Olsen, K. T., 77
Olson, Delmar W., 177
Osgood, E. W., 364

P

Palestrant, Simon S., 163, 218, 242, 337
Parkes, George H., 170, 181
Passoja, Everett R., 377
Pawelek, Alan R., 103
Peterson, Norman, 176
Pickett, Ralph E., 137
Pikus, John H., 72, 204
Platnick, I., 242
Popkin, Ralph B., 213, 384
Powers, Ed C., 38

R

Rathbun, Jesse E., 218
Rawson, E. J., 287
Ray, J. Edgar, 213, 278
Redmond, Carlton, 420
Rerucha, E. A., 27, 381
Reynolds, James O., 237, 333
Rose, Homer C., 24, 212, 284, 336
Rothrock, Thurston M., 19
Ruley, M. J., 136, 345

S

Schneider, Kurt, 274
Schrei, Donald, 378
Schultz, H. D., 39
Schweisheimer, Waldemar, 276
Senkewitz, Edward G., 329
Sherman, V. L., 361
Shindler, Carlton H., 281
Smith, Homer J., 157, 191, 233
Soderberg, George A., 106
Stack, Herbert J., 275
Stainsby, C. V., 424
Stapleford, Vernon D., 394
Stocking, Wm. R., Jr., 291
Stucki, Ralph E., 119
Suerken, Ernst H., 354

T

Taylor, Louie S., 293
Teasmer, Arthur W., 131
Thomas, B. H., 38A (Mar.)
Thomson, Carson F., 180
Tibbitts, F. Lyman, 234, 308, 396
Trusal, Maurice E., 329

V

Van Winkle, Paul, 426
Venable, E. Clay, 327

W

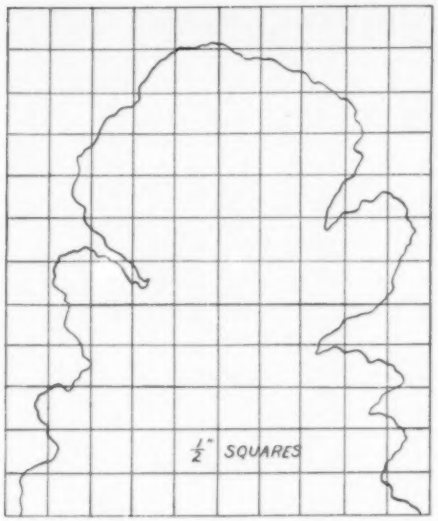
Wells, Charles F., 363
Wenger, Paul N., 195
Whittle, Robert L., 340
Wieda, Alfred, 327
Williams, Amos G., 118
Willmott, John N., 340
Willoughby, George A., 88
Wilson, J. Douglas, 219
Wright, Welcome E., 245

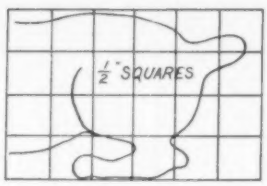
Y

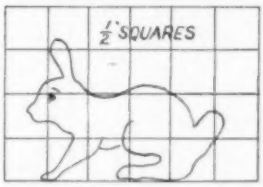
Yard, Clifford L., 178

Z

Zaenglein, C. F., 339







NO.	PART	SIZE
2	BASE - WHITE PINE	$\frac{3}{4} \times 4\frac{1}{2} \times 5\frac{1}{2}$
2	UPRIGHT - PLYWOOD	$\frac{1}{8} \times 4\frac{1}{2} \times 6\frac{1}{4}$
1	LOG - WHITE PINE	$2\frac{1}{4} \times 2\frac{3}{4} \times 5$
1	DOG - WHITE PINE	$1\frac{1}{4} \times 2 \times 3$
1	RABBIT - WHITE	$\frac{3}{4} \times 2 \times 2\frac{1}{2}$

Details of book ends

The bases are painted brown with occasional irregular spots of green to resemble grass. The log is painted brown and then shaded with white while it is still wet to give the gray brown of weather-beaten bark. The uprights are painted with a dark green enamel. While they are still wet, the shadows are blended in with a small brush and a bit of black. Then the high lights are blended in the same way by using a lighter shade of green and a bit of yellow. It is very simple to work out foliage patterns while the ground coat is wet by using the constrasting colors.

The dog is white with black spots. The rabbit is given a coat of brown over the back and white underneath. Then white is blended into the brown to give the gray brown necessary. A bit of black on the tail and the eyeball completes the job.

The pieces of log are fastened to the uprights with wood screws and the bases are attached with nails. A little plastic wood piled up at the holes in the log and a few bits of bark or wood splinters embedded in it, add to the reality. For an added touch, small bushes made from bits of sponge and painted green can be cemented to the sides of the log. The rabbit can be fastened to the base by a pin driven down through the body. The dog is pushed into the hole in the log, then the inside of the uprights and the under sides of the bases are covered with blotter glued in place and the job is finished.

JIG FOR MEASURING TAPER PER INCH ON THE LATHE

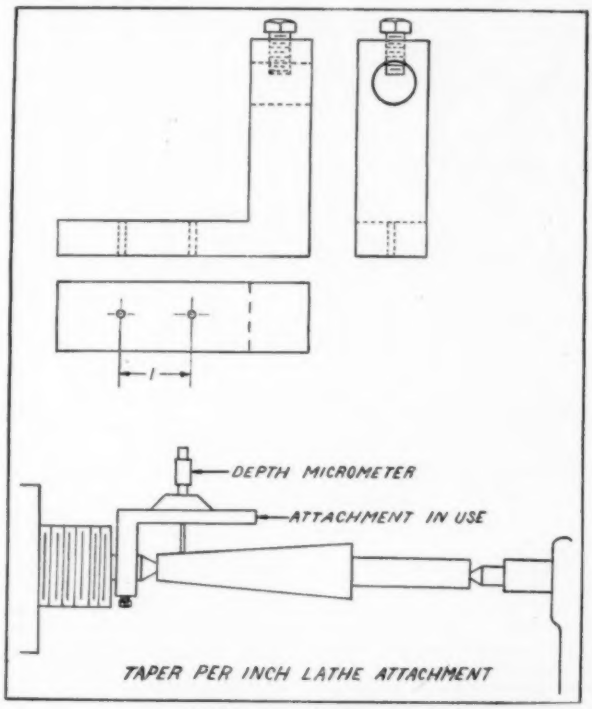
H. MOORE
Kirkstall, Leeds, England

An operation that is quite difficult is the measurement of taper per inch. In fact, without some sort of preparatory work it is impossible to do the job accurately. To make it as simple as possible the attachment described herein was devised.

If the lathe has a center with a straight shank, so much the better; if not, one must be made. The actual attachment is a right angle steel plate with one side thicker than the other. The thick side must be made a wringing fit on the center, as shown, and a screw is added to hold it in place. The two small holes are for the spindle of a depth micrometer and they, too, must be spaced carefully at exactly one inch apart.

When a taper needs testing, slip the attachment in place and take the measurement between the face of the attachment and the work through the first hole. Note the dimension and take the second measurement through the second hole. Subtract this from the first and double it for the full taper per inch.

If this device is correctly made and used the resulting measurements will be exact.



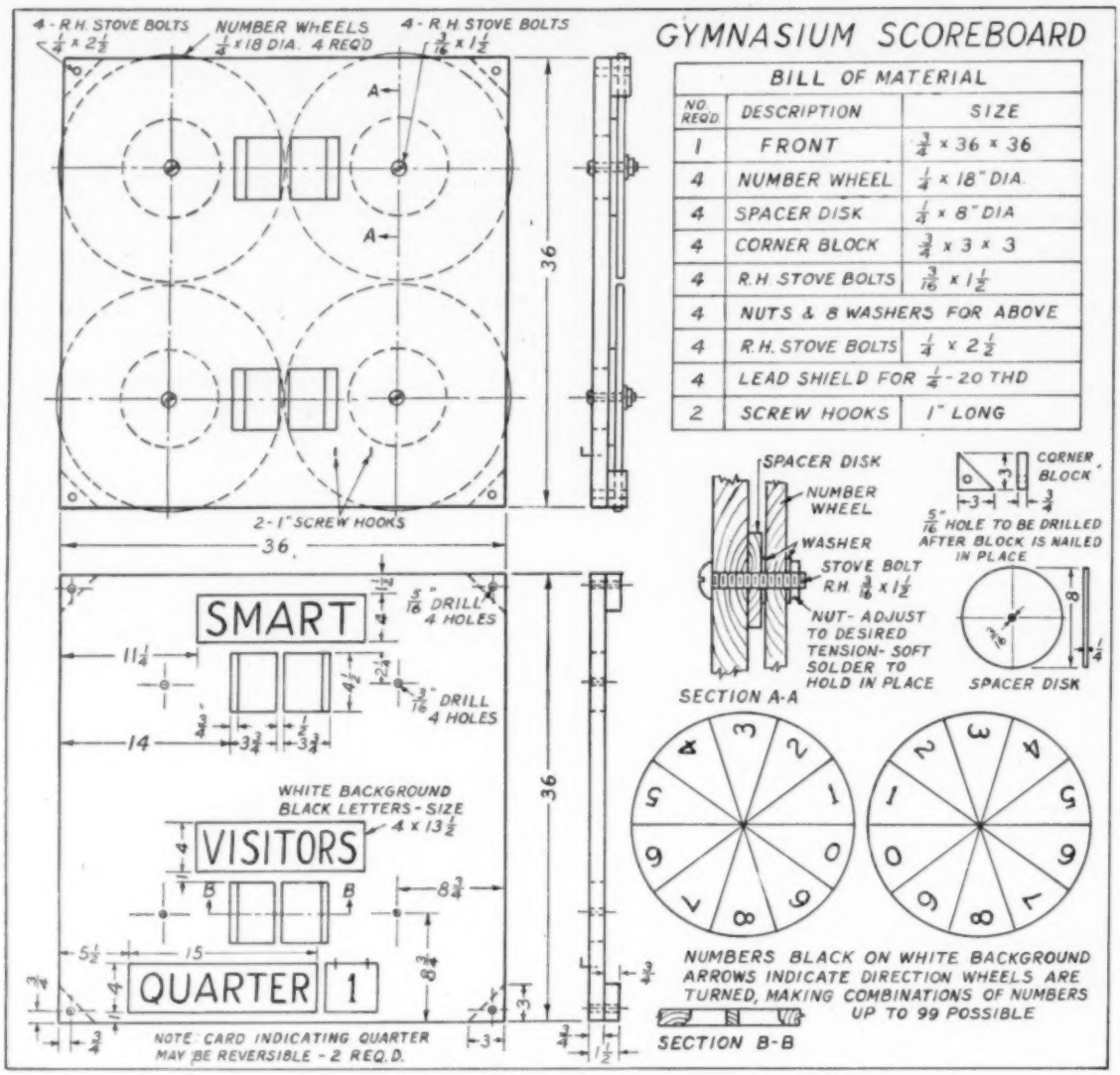
Jig for measuring taper per inch

GYMNASIUM SCOREBOARD

R. PAUL LIGHTLE
Instructor, Industrial Arts
James H. Smart School
Fort Wayne, Ind.

This scoreboard was developed as a simple and inexpensive device for the school gymnasium. It may be used for basketball, volleyball, soccer, and other games where scoring is needed. The construction is such that there are no complicated moving parts to wear out. The operation is so simple that any child, with a little instruction, can learn to operate it.

The number wheels are made of ¼-in.


GYMNASIUM SCOREBOARD
BILL OF MATERIAL
NO. REQD | DESCRIPTION | SIZE
1 | FRONT | ¾ x 36 x 36
4 | NUMBER WHEEL | ¼ x 18" DIA.
4 | SPACER DISK | ¼ x 8" DIA
4 | CORNER BLOCK | ¾ x 3 x 3
4 | R.H. STOVE BOLTS | 3/16 x 1½
4 | NUTS & 8 WASHERS FOR ABOVE
4 | R.H. STOVE BOLTS | ¼ x 2½
4 | LEAD SHIELD FOR ¼-20 THD
2 | SCREW HOOKS | 1" LONG
4 - R.H. STOVE BOLTS ¼ x 2½
NUMBER WHEELS ¼ x 18 DIA. 4 REQD
4 - R.H. STOVE BOLTS 3/16 x 1½
2 - 1" SCREW HOOKS
SMART
VISITORS
QUARTER 1
5/16" DRILL 4 HOLES
3/16" DRILL 4 HOLES
WHITE BACKGROUND BLACK LETTERS - SIZE 4 x 13½
NOTE: CARD INDICATING QUARTER MAY BE REVERSIBLE - 2 REQ.D.
SPACER DISK
NUMBER WHEEL
WASHER
STOVE BOLT R.H. 3/16 x 1½
NUT - ADJUST TO DESIRED TENSION - SOFT SOLDER TO HOLD IN PLACE
SECTION A-A
CORNER BLOCK
5/16" HOLE TO BE DRILLED AFTER BLOCK IS NAILED IN PLACE
SPACER DISK
NUMBERS BLACK ON WHITE BACKGROUND
ARROWS INDICATE DIRECTION WHEELS ARE TURNED, MAKING COMBINATIONS OF NUMBERS UP TO 99 POSSIBLE
SECTION B-B

Details of scoreboard

plywood cut into circles 18 in. in diameter. The numbers are black on a white background. These four wheels project ¼-in. beyond the edge of the front board. The number wheels are separated from the board by circular spacers ¼-in. thick, and 5 in. in diameter, and are referred to as disks. The disks prevent the numbers from wearing off, through rubbing. Although the number wheels are made of wood, a heavy grade of sheet metal could be used. This would eliminate any difficulty encountered by warping, which might happen if green plywood is used.

The front is made of ¾-in. plywood, 3 ft. square. The windows or openings are 3 by 4 ½ in., with the vertical edges beveled, thereby giving a larger area of vision. The corners are built up a thickness of 1½ in. by nailing small triangular blocks to the back side. This keeps direct pressure off the number wheels and lets them turn freely.

The scoreboard is fastened to the wall with ¼-in. roundhead bolts screwed into lead shields.

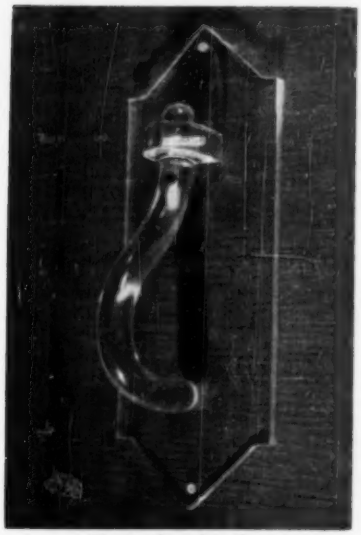
For finish, we elected to use spar varnish and no stain.

PLASTIC DOOR KNOCKER

CHRIS H. GRONEMAN
Industrial Education Department
The A. & M. College of Texas
College Station, Tex.

The Plexiglas or Lucite door knocker described in this article is an application of plastics to modern house accessories. It is a well-designed project and is one which can be put to use immediately upon completion.

Many processes are involved to produce this



Plastic door knocker

novelty. In the event that solid, round stock is not available for the knocker, it may be built up by the soak-cement process. The pivot pin may be dressed from plastic or a metal pin may be used.

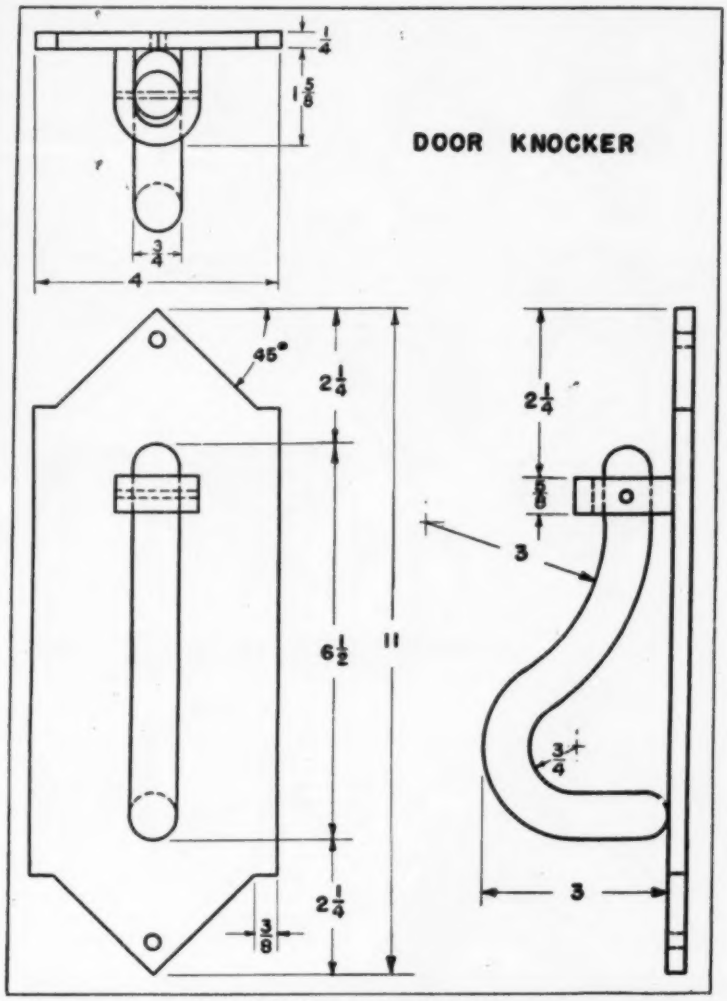
Since this door knocker will not tarnish, it will not have to be polished — a fact which housewives will appreciate. An imaginative person also might take advantage of the transparency of the knocker base to mount behind it a design or color that would harmonize with shutters or door trim. The possibilities are unlimited for decorative effects.

BILL OF MATERIAL

No. of pcs.	*Name*	*Material*	*Size*
1	Back	Plastic	¼ x 4 x 11
1	Knocker	Plastic	¾ dia. x 10
1	Knocker support	Plastic	¼ x ⅝ x 4
1	Pin	Plastic or metal	5/16 x 1¼
	Plastic cement		

Procedure:

1. Lay out all parts on the Plexiglas or Lucite.
2. Cut out with jig or band saw.
3. File the edges of back and knocker holder.
4. Center the round stock in the lathe and turn the knocker.
5. Buff all parts.
6. Heat the knocker and knocker support and form to the desired shape.
7. Make the plastic pin.
8. Center punch and drill the hole for the plastic pin.
9. Center punch and drill the holes for fastening the back to the door.
10. Lines may be scribed on the back for enrichment of design.
11. Place the knocker support in position and apply cement.
12. Assemble the knocker and insert the pin.



Details of plastic door knocker

13. Apply a coat of wax and polish with a soft cloth.

Fig. 11. The oval ring with turquoise setting and the other before setting the malachite. The padding of phonograph record material is not shown

INDIAN SILVERSMITHING

BEN HUNT
Hales Corners, Wis.

(*Continued from page 385 of the November, 1949, issue*)

Men's Rings

Most people admire the heavy cast rings made by Indians. But casting them is quite a complicated undertaking, requiring tufa rock, when made by the method commonly used by the Indians. The two rings shown on Plate 40 have all the earmarks of cast rings with quite a bit less weight. This is an advantage, because cast rings, especially large ones, if they do not fit snugly, have the habit of rolling or sliding over to one side of the finger.

One of the rings, described in this article

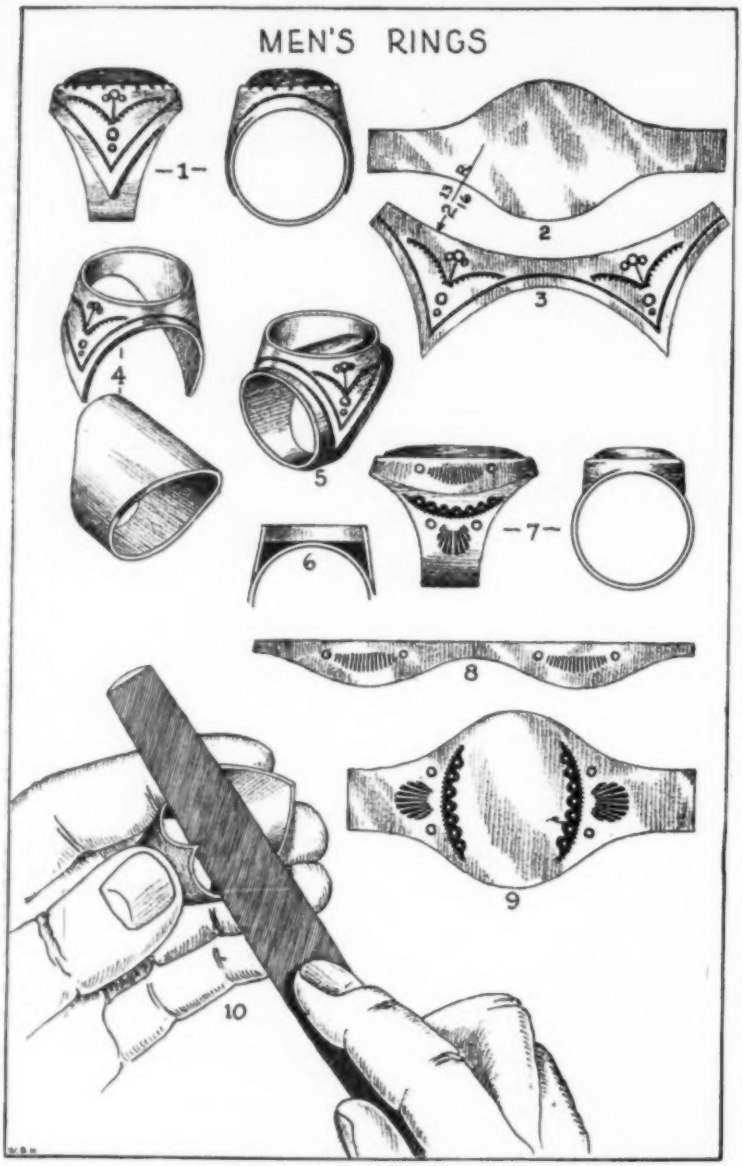


Plate 40

Fig. 12. The finished rings

was made in one afternoon and the other one, with the malachite stone, was made in one evening, and that included the cutting and polishing of the stone. The author admits that it was a rather long evening, but it shows what can be done by soldering, compared to casting.

First, the ring band is made, Figure 2, Plate 40. The pattern is slightly larger at the top to allow for good soldering, and the surplus silver is filed off later. The ring band should be made to the correct size and soldered, providing no stamping is done. Then the bezel, Figure 3, Plate 40, is cut, after which it is formed to see how closely it fits over the band. But do not solder it as yet. When a fairly good fit has been obtained, the bezel is flattened out carefully and then the stamping is done, Figure 3, Plate 40. Next, bend it to shape again, using a mandrel in this case, and solder the ends. Then comes the final fitting. File it as shown in Figure 10, Plate 40, until it fits perfectly flat on the top of the band. The tapering away of the sides of the bezel can be seen in Figures 11 and 12. When the bezel has been fitted closely, wire it and solder, placing the solder snippets inside of the bezel. After soldering, file away the surplus.

There are two ways of forming a base for the stone. The ring with the oval turquoise was made first. A flat plate was soldered inside the bezel for the stone to rest on. To form the bed for the stone as was done in the other ring, clamp the ring in the vise and place some pieces of a broken phonograph record into the bezel. Then carefully heat the ring until the phonograph record material becomes soft. Then press it down to form a flat base for the stone. Figure 6, Plate 40, shows how this is done.

In making the ring shown in Figure 7, Plate 40, the bezel had straight sides, but the same procedure was followed in making the ring. The band was made first, and bent over a mandrel as though ready for soldering. The bezel was cut out, bent to fit the stone, and filed to fit the band. Hold it in place on the band and mark where it fits. These marks will show where the stamping on the ring is to go. Straighten out the band and stamp it. The soldering is done as before mentioned — first the band and then the bezel. After soldering the bezel, bend it carefully to fit the stone. File it to fit and wire and solder it to the band. Next, if you wish, you can solder a flat piece of silver or thin copper for the base of the stone or make a bed of phonograph-record material as previously described. File off the surplus silver and polish and set the stone.

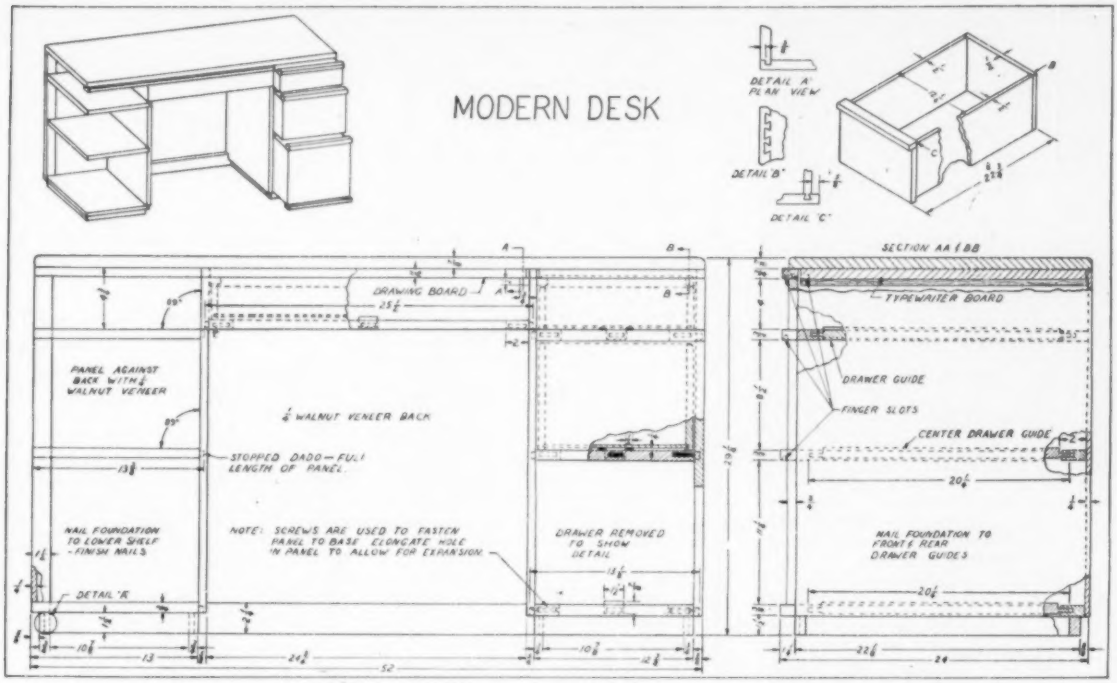
The procedure in making the ring, Figure 1, Plate 40, differed from that followed in making the ring shown at Figure 7, Plate 40, as the stone in this case was cut to fit the setting. The plain appearance of the bezel was improved by filing the notches shown. Eighteen-gauge silver was used for the bands and 20-gauge was used for the bezels. The edges of the bezels were filed down to make the setting of the stones somewhat easier.

A MODERN DESK

CARLTON REDMOND

Senior, Industrial Arts Major
Kent State University
Kent, Ohio

This modern desk is an ideal project for students in advanced machine woodworking. Construction of the desk involves many hand and machine operations. Special features of the desk are (1) the three open front and side shelves of various heights to accommodate all sizes of books, magazines, pamphlets, and


MODERN DESK
DETAIL 'A' PLAN VIEW
DETAIL 'B'
DETAIL 'C'
SECTION AA & BB
DRAWING BOARD
TYPEWRITER BOARD
PANEL AGAINST BACK WITH ¼ WALNUT VENEER
¼ WALNUT VENEER BACK
DRAWER GUIDE
FINGER SLOTS
CENTER DRAWER GUIDE
STOPPED DADO—FULL LENGTH OF PANEL
NAIL FOUNDATION TO LOWER SHELF - FINISH NAILS
NOTE: SCREWS ARE USED TO FASTEN PANEL TO BASE ELONGATE HOLE IN PANEL TO ALLOW FOR EXPANSION
DRAWER REMOVED TO SHOW DETAIL
NAIL FOUNDATION TO FRONTS REAR DRAWER GUIDES
DETAIL 'R'

Details of modern desk

papers; (2) the concealed drawing board over the center drawer. This drawer is large enough to store all necessary drawing equipment. (3) The concealed typewriter board over the top right-hand drawer, and (4) the large bottom drawer in which to store a typewriter.

The expansion and contraction of the wood that occurs with temperature and humidity change is in many cases great enough to crack the wood, but this tendency is eliminated by having the grain of the wood parallel in the top, sides, shelves, and also by some unglued joints and elongated screw-shank holes in the frame construction.

Constructional Hints

The joints used for the shelves are full-length dados, stopped ½ in. from the front edge of the desk. The rear left corners of the shelves are notched out ¼ by 1½ in. so as to fit around the shelf support and butt against the ¼-in. walnut veneer plywood back. The shelf support has a rabbet ¼ by 1¼ by 26¾ in., and should be glued and screwed to the shelves before the back is installed. The ¼-in. walnut veneer plywood panels are fitted between the shelves and glued against the back of the desk to support the rear edge of the shelves.

The desk is best constructed in the following order: (1) drawer section, (2) shelf section, (3) foundation, (4) back, (5) top. The natural beauty of the wood is an essential part

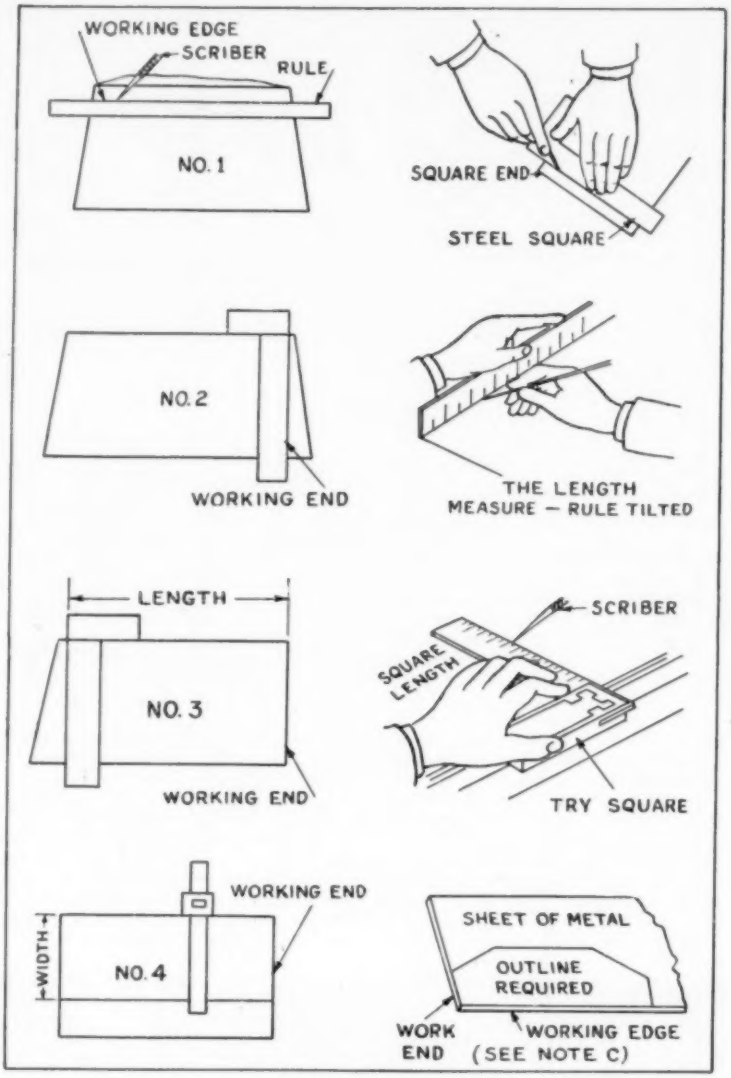
Putting the finishing touches on the desk

A modern desk

of the simple design brought out by the application of one coat of filler, two coats of sealer, and three cross coats of lacquer (applied with spray gun). The last coat of lacquer is hand rubbed with a lacquer rubbing compound. The finish on this project is especially important and should be applied with great care.

BILL OF MATERIAL

No. of pcs.	*Part*	*Wood*	*Size*
1	Top	Walnut	7/8 x 23½ x 52
1	Back	Walnut veneer	¼ x 26¾ x 51½
1	Right side	Walnut	⅝ x 22¾ x 26¾
1	Left side, drawer section	Walnut	⅝ x 23¼ x 26¾
1	Left side	Walnut	⅝ x 23¼ x 26¾
3	Shelves	Walnut	¾ x 23¼ x 13⅜
3	Right drawer slides	Walnut	¾ x 2 x 13⅜
3		Maple	¾ x 2 x 13⅜
6		Maple	¾ x 2 x 20¼
1	Center drawer slides	Walnut	¾ x 2 x 25½
1		Maple	¾ x 2 x 25½
2		Maple	¾ x 2 x 20¼
4	Drawer guides	Maple	⅞ x 1½ x 20¼
	Top right drawer		
1	Front	Walnut	¾ x 4 x 13
1	Back	Maple	½ x 3⅜ x 12¼
2	Sides	Maple	½ x 3⅜ x 22¼
1	Bottom	Masonite	⅛ x 11⅝ x 22
	Middle right drawer		
1	Front	Walnut	¾ x 8½ x 13
1	Back	Maple	½ x 8⅜ x 12¼
2	Sides	Maple	½ x 8⅜ x 22¼
1	Bottom	Masonite	⅛ x 11⅝ x 22
	Bottom right drawer		
1	Front	Walnut	¾ x 11¼ x 13
1	Back	Maple	½ x 11⅜ x 12¼
2	Sides	Maple	½ x 11⅜ x 22¼
1	Bottom	Masonite	⅛ x 11⅝ x 22
	Center drawer		
1	Front	Walnut	¾ x 4 x 26
1	Back	Maple	½ x 2⅝ x 24⅝
2	Sides	Maple	½ x 2⅝ x 22¼
1	Bottom	Masonite	⅛ x 24⅛ x 22
5	Drawer handles	Walnut	¾ x 1¼ x 13
1		Walnut	¾ x 1¼ x 26
1	Drawing board	White pine	11/16 x 22½ x 23⅝
2		Maple	11/16 x 1 x 22½
2	Drawing board sides	Maple	½ x ¾ x 22½
1	Typewriter board	Walnut	11/16 x 22½ x 10¼
2	Typewriter board slides	Maple	½ x ¾ x 22½
1	Shelf support	Walnut	½ x 1½ x 26¾
	Panels		
1	Top shelf	Walnut veneer	¼ x 4¾ x 11½
1	Middle shelf	Walnut veneer	¼ x 8½ x 11½
1	Bottom shelf	Walnut veneer	¼ x 11¼ x 11½
1	Foundation	Walnut	¾ x 2¼ x 50¾
2		Walnut	¼ x 1½ x 12⅜
4		Walnut	¾ x 1½ x 21⅜
24	Screws		No. 10 x 2½ f.h.
16	Screws		No. 10 x 2 f.h.
6	Screws		No. 8 x 1¼ f.h.
16	Screws		No. 8 x 1 f.h.
12	Screws		No. 8 x ¾ r.h.
12	Top fasteners		



Sheet-metal layout

SHEET-METAL LAYOUT

HOWARD L. BEAN

Instructor of Industrial Arts and Crafts
Toronto, Ontario, Canada

Operation: Squaring stock.

Tools used: Rule, scriber or scratch awl, snips or shears. Try square or combination square, metal marking gauge, flat file.

To lay out: In stretchout drawings for sheet-metal work a broken line will indicate a bend. On the metal itself, however, whole lines will be used entirely. Consult your *drawing* to see where to cut out.

Straight lines are laid out with straightedge and scriber. When using scriber on tin plate be sure to scribe a *light* line. If using a pencil be sure it is sharp.

Lay out lines at an angle of 90 deg., with try square or combination square and scriber.

Squaring up:

1. *Working edge:* Using scriber and straightedge, mark a straight line close to one edge and shear to this line.

NOTE: Cut close to the line but on the waste side of it.

2. *Working end:* Using scriber and try square, square a line across, close to one end; cut to this line with the snips. File, square, and true.

3. *Length:* From the working end measure

the required length. Using scriber and try square, square a line across. Shear to this line.

4. *Width:* From the working edge gauge the width, or using a rule and scriber mark off the width in two places, and draw a straight line joining the two points. Shear to this line.

NOTE: A. All edges should be smoothed with file after cutting.

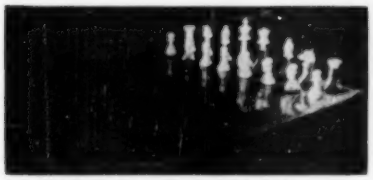
B. It may be more convenient at times to mark and cut the width *before* the length.

C. It is often advisable to make a layout directly from the working edge and working end.

THE PLASTIC CHECKERBOARD

JOHN EMMEL
Connelley Vocational High School
Pittsburgh, Pa.

This plastic checkerboard is striking in appearance and easy to make.



Ready for a game of chess

Two pieces of Lucite or Plexiglas are needed, each piece 18 in. square. The top piece is ¼ in. thick and is clear. The bottom piece is ⅛ in. thick and is black.

When making the board, do not remove the masking. Machine the wide groove around the edge first as this provides space into which the tool may run. The squares are made by milling with a 1/16-in. slitting saw to a depth of 1/32 in. After all the slots have been milled, remove the masking from every other square and spray with gold lacquer.

When dry, remove masking from remaining squares and cement the black sheet to the clear one, keeping the lacquered surface in the middle. The clear squares will now show up a brilliant black, the gold showing through the clear sheet making a striking contrast.

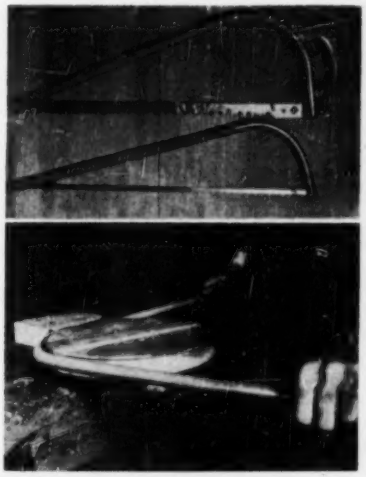
As all machining and coloring is at the center of the sandwich, the coloring is protected.

BOW-TYPE SAWS

D. C. MARSHALL
Industrial Arts Instructor
High School
Manhattan, Kans.

Saws for pruning and general use around the garden and orchard can be easily made from thin walled electrical tubing and old band-saw blades. The ½-in. tubing is strong enough and can be easily bent to shape. A jig for bending the tubing can be made of a circular block with a grooved edge to fit the round tubing with a backing block. After bending, the tubing is slit at the end with a hack saw to receive the blade. If desired, the tubing may be flattened at the front end and a take-up bolt may be attached at the rear end so that the blade may be tightened with a wing nut.

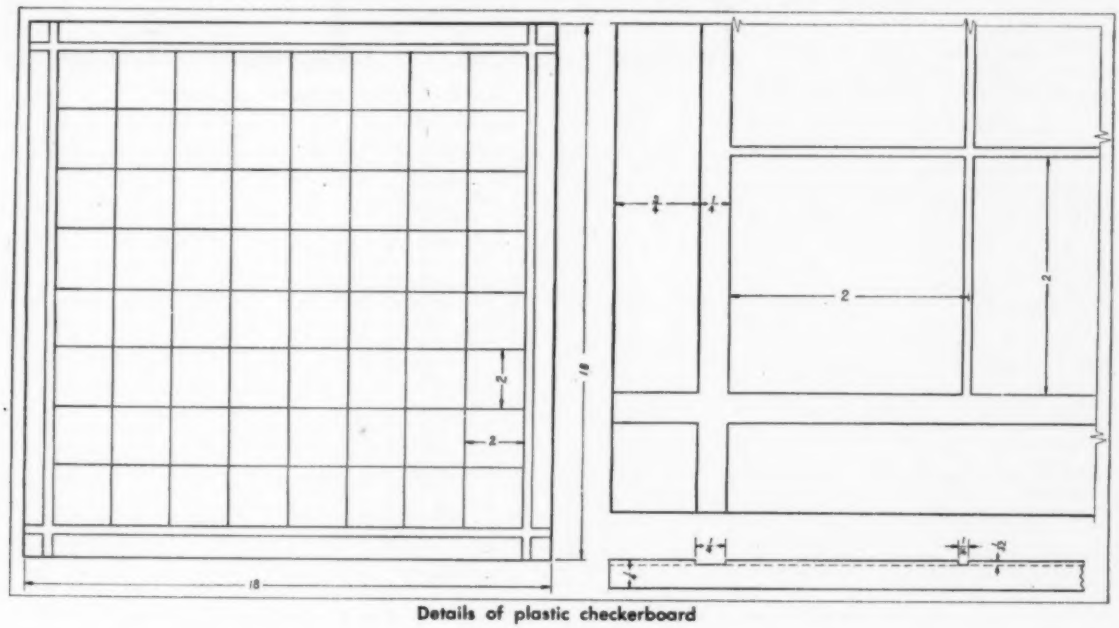
If desired, regular pruning blades may be purchased at low cost for the saw frame. Band-saw blades that have crystallized and can no longer be used, may be cut into lengths.



Above: The upper saw has a blade made from a piece of band-saw blade that has been filed to give the teeth less pitch for easier hand sawing. The lower saw has a regular pruning saw blade

Below: A jig for bending light metal tubing is made of a circular disk with a grooved edge and a follower block fastened to a heavy wood base

The teeth must then be filed with less pitch so they will cut properly. The blades are drilled to receive a pin at each end to hold them in the frame.



Details of plastic checkerboard

Wood handles may be added or the saws may be used without. If a handle is used, it should be made of hardwood and bolted to the saw frame with stove bolts. A coat of enamel makes a suitable finish for the job.

MODEL HOUSE

C. V. STAINSBY
Industrial Arts Instructor
Delta Junior–Senior High School
Ladner, B. C., Can.

The British Columbia industrial-arts course provides for instruction in wall framing and roof construction. As a teaching aid I built a model house frame as shown in the accompanying photograph. The model is built to one-eighth scale and each piece of lumber used in its construction is one eighth the nominal size. Where nailing was possible cigar box nails were used. Many of the nails had to be pressed in as the frame would not stand much hammering. Some parts of the frame, such as the bridging between joints, were too light for nails and were fastened in place with glue.

The model contains the same number of pieces as would be required in a full size house. As many as possible of the ordinary constructional features are involved, including a hip roof over the main building, gable roof over the dormer, framing of chimney opening and stair stringers. Standard building construction is illustrated throughout. Sections of sheathing were placed on roof and walls for the double purpose of showing its application and bracing the frame. The finished model is absolutely rigid and can be handled easily and safely.

Only enough of the subfloor was laid to support the wall frames. The rest of the floor space was left open to show the joists and

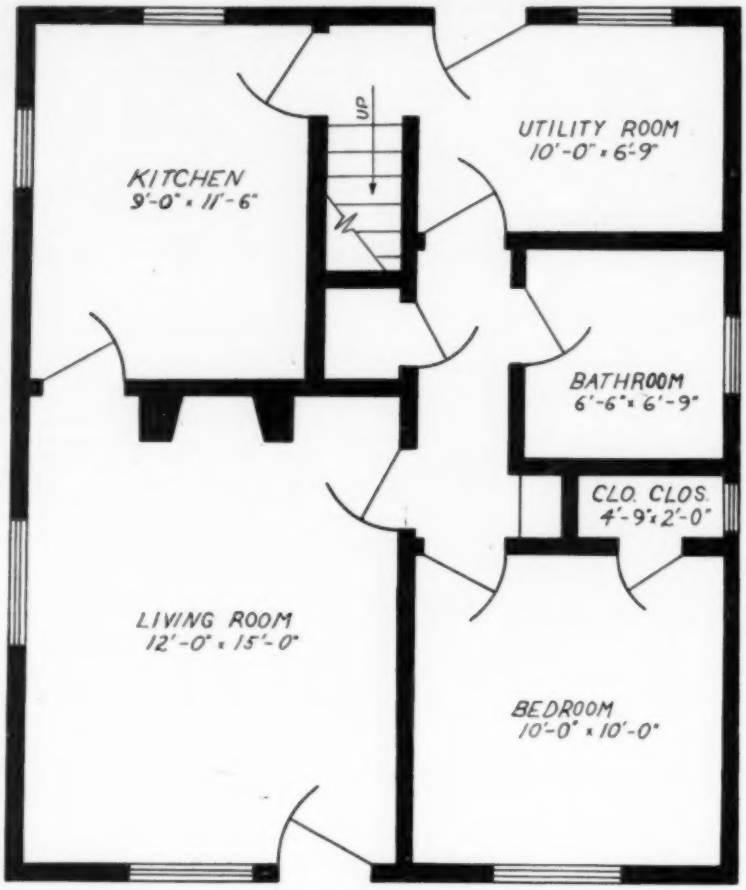


Fig. 3. Plan of house

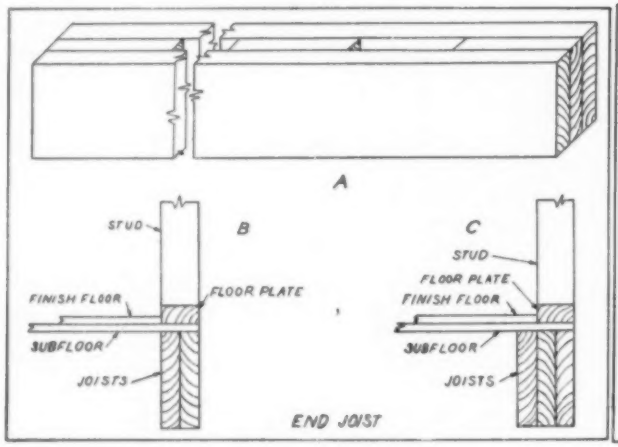


Fig. 1. Detail of end joist

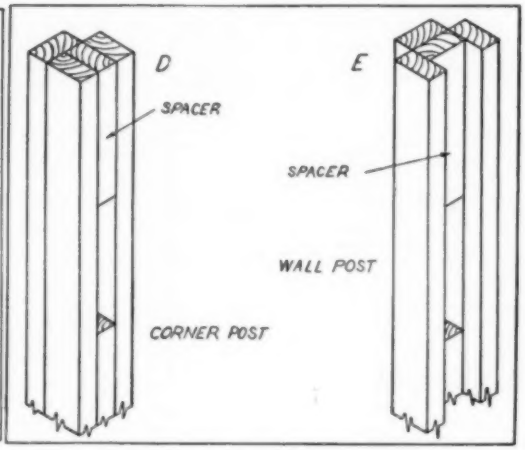


Fig. 2. Details of corner posts

bridging below. At the right of the front door one stud was cut off part way up and sections of the floor plate and subfloor were removed to show the construction of the first joist.

The model was on display for two weeks in a local store. Features that seemed to attract special attention were the end joists, the corner posts, and the wall posts.

The end joists are built up of two full length joists separated by spacers as shown in sketch A, Figure 1. This arrangement gives solid support to the ends of the finished floor when it is laid. When the first joist is merely doubled the double thickness is entirely covered by the floor plate under the end wall so that the ends of the finished floor can be nailed only into the subfloor. Sketch B, Figure 1.

When the first joist is built up as shown the finished floor can be nailed into a joist. Sketch C, Figure 1.

Corner posts are built up of three full length studs with spacers between two of them. Sketch D, Figure 2.

Solid backing for lath and plaster or wallboard, where one wall butts against another, is obtained by a different arrangement of three studs and spacers in the wall posts. Sketch E, Figure 2.

In order to keep the model from being too cumbersome it was necessary to design a small house that would contain all the desired features. Figure 3 shows the plan. Building the model entailed a considerable amount of work but the effort has proved to be well worth while. Lessons on framing are much more effective as constant reference is made to the model to illustrate the points under consideration.

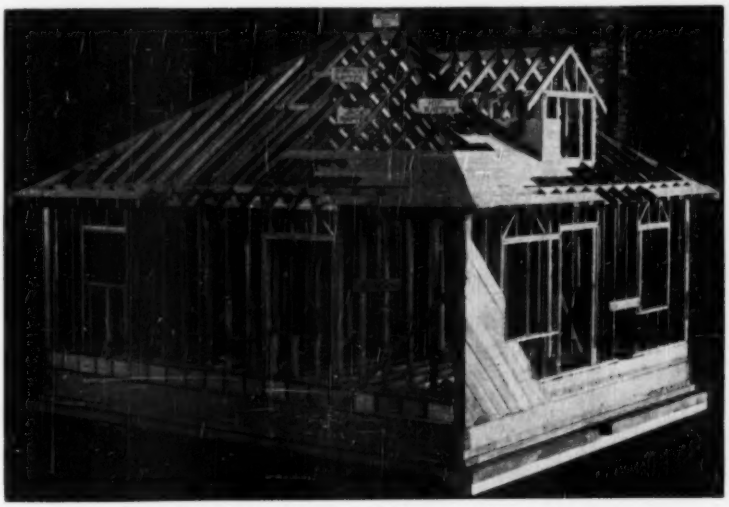


Fig. 4. Model house used as teaching aid

WOOD FINISHING CHART

FRED L. GRIFFIN
Assistant Professor of Industrial Arts
University of California
Santa Barbara College
Santa Barbara, Calif.

The proper finishing of woodwork projects made by students in the school shops is extremely important and desirable, and it presents a real challenge to all concerned. Unfortunately, it is that part of shopwork which too often is sadly neglected. However, the right finish, correctly and carefully applied to a piece of furniture adds considerable beauty and value to it and instills a great deal of pride and satisfaction in the person who made the piece. A common excuse for permitting inferior finishes is the lack of adequate finishing rooms. Too often, however, the real reason is the instructor's lack of knowledge of finishing, and his reluctance to spend the time to look up the desired information.

The finishing chart submitted herewith is designed to supply immediate workable infor-

WOOD FINISHING CHART

Finishing Operations

1. Raise grain with water, sand when dry
2. Water stain any color
3. Oil stain any color
4. Ivory oil stain
5. Bichromate of potassium
6. Poster paint — any color
7. White shellac 1 thin coat
8. Paste wood filler — walnut
9. Paste wood filler — natural
10. White shellac — 4 coats
11. Varnish — 4 coats
12. Enamel — 4 coats
13. Sanding sealer — 3 coats
14. Brushing lacquer — 2 coats
15. Spraying lacquer — 2 coats
16. Linseed oil to bring out grain
17. Oil stain — brown
18. Linseed oil — rubbed many coats
19. Wood filler — silver gray
20. Sand between coats No. 3/0 paper
- *21. Sand last coat No. 6/0 and 3 F pumice wet in oil
22. Paste wood filler — white
23. Maple oil stain
24. Steel wool No. 2/0
25. Wire brush
- *26. Rottenstone and oil with felt pad
27. Paste floor wax — 2 coats
28. Picture transfer
29. Shellac rubbed — many coats
30. Shellac 1 coat to hold in pitch
31. Dextrine glue
32. Chlorox, or other bleach (poison)
33. Water stain — brown
34. Borax solution — (neutralizer)
35. Flat varnish — 2 to 3 coats
36. Sand after second coat — No. 3/0 paper
37. Silver gray oil stain
38. Wood filler — colored to match stain

*Rubbing oil made of ½ kerosene and ½ machine oil.

Wood		*Remarks*	*Operation Numbers*
Black walnut	I	Light rubbed varnish finish	7 8 11 20 21 26 27
Black walnut	II	Dark rubbed varnish finish	8 11 20 21 26 27
Black walnut	III	Rubbed oil finish	8 18
Red cedar	I	Light rubbed shellac finish	10 20 21 26 27
Red cedar	II	Dark rubbed varnish finish	16 11 20 21 26 27
Red cedar	III	Light clear lacquer finish	13 20 15 21 26 27
Gum wood	I	Rubbed shellac on figured gum	16 10 20 21 26 27
Gum wood	II	Walnut imitation of plain gum	1 33 24 11 20 21 26 27
Birch	I	Natural clear lacquer finish	13 14 20 21 26 27
Birch	II	Water stained rubbed varnish	1 2 24 11 20 21 26 27
Maple	I	Oil stained rubbed varnish	23 11 20 21 26 27
Maple	II	Natural rubbed shellac finish	10 20 21 26 27
Maple	III	Old English finish	1 5 24 11 20 21 26 27
Maple	IV	Bleached	32 34 13 20 14 21 26 27
Mahogany	I	Water stained rubbed varnish	1 2 24 38 11 20 21 26 27
Mahogany	II	Oil stained rubbed varnish	3 7 38 11 20 21 26 27
Mahogany	III	Spanish finish	1 33 24 22 7 27
Mahogany	IV	Silver gray rubbed shellac	37 19 10 20 21 26 27
Mahogany	V	Bleached lacquer finish	32 34 22 13 20 14 21 26 27
Mahogany	VI	Natural rubbed varnish finish	9 11 20 21 26 27
Quartered oak	I	Natural rubbed varnish finish	9 11 20 21 26 26
Quartered oak	II	Stained rubbed varnish finish	17 7 8 11 20 21 26 27
Plain oak	III	Stained rubbed varnish finish	3 7 38 11 20 21 26 27
Red wood	I	Natural varnish finish	11 20 21 26 27
Red wood	II	Weathered flat varnish finish	1 5 35
Oregon pine or	I	Vertical grain rubbed shellac	10 20 21 26 27
Douglas fir	II	Pickle finish flat varnish	4 30 35 20
Douglas fir	III	Slash grain-rubbed varnish	3 30 11 20 21 26 27
Douglas fir	IV	Slash grain wire brushed	25 4 10 24 27
Sugar pine or	I	Natural white shellac finish	10 20 21 26 27
White pine	II	Poster paint shellac finish	1 6 10 36 21 26 27
White pine	III	Enamel and transfer	30 12 20 21 26 28 27
White pine	IV	Crackel finish	31 6 10

mation at the time it is urgently needed. The information is arranged to give step-by-step procedures in obtaining many of the standard and modern finishes on several kinds of common wood. From two to five different finishes are analyzed for each kind of wood. In the first column, the name of the wood is listed. In the second column, the number of the finish is given. In the third column, a brief description of the finish is given. In the fourth column, operation numbers appear, indicating the operations to be performed which correspond to the operations listed in the table on finishing operations.

Additional woods and finishes not appearing on this chart may be added at the instructor's suggestion.

This chart will be found extremely useful and convenient to use as a flexible working guide in wood finishing classes, as well as a ready reference in the wood shop classes.

For wood finishing classes, a set of sample blocks, about ¼ by 2½ by 6 in., made of different common woods, should be prepared by each student and finished with all the finishes specified on the chart, plus any other desired write-in samples. Before finishing the blocks, stickers may be pasted on the backs with the operation numbers written on them, and as the finishing proceeds, the numbers may be checked off. After the blocks are completely finished, these papers and all the excess oil and dirt on the unfinished side can be planed or scraped off, leaving only the clean natural wood. Then, new 2 by 4-in. labels, typed with the name of the wood, the actual step-by-step procedures, and the student's name should be pasted on the backs. These blocks, when properly finished and correctly labeled, make very useful and valuable teaching aids.

Following is a sample label for the back of mahogany block No. 1.

MAHOGANY

Water Stained — Rubbed Varnish

1. Raise grain with water
2. Water stain, A.B. No. 125, brown
3. Steel wool No. 2/0
4. Wood filler — colored to match stain
5. Varnish — 4 coats
6. Sand between coats, No. 3/0 paper
7. Sand last coat No. 6-0 and 3 F pumice, wet in oil
8. Rottenstone and oil with felt pad
9. Paste floor wax, 2 coats

.....

Name of Student

In order to be of the greatest service to a teacher, a set of finishing samples should be placed in a convenient case or container for display purposes and for storage when not in use. A good holder may be made of soft cloth constructed with pockets for holding the blocks. The over-all size will depend on the number and size of the blocks, but the pockets themselves should be uniform in size. For ¼ by 2½ by 6-in. blocks, a size of 3 in. wide and 4 in. high, with 3½ in. between the rows of pockets is the correct size. When not in use as a wall hanging, the case and contents may be folded, and rolled into a compact bundle for convenient storage.

OPERATION UNITS IN PRINTING

MAURICE J. NELSON

Professor of Industrial Education, State Teachers College, Mankato, Minn.

How to:	*Inst. Manual for Young Printers Selvidge-Witt*	*Printing Occupations C. W. Hague*	*Practice of Printing R. W. Polk*
1. Plan a Procedure	p. 16	p. 96	p. 271
2. Learn the Case	p. 42	p. 24	p. 30
3. Set a Stick to Measure	p. 44	p. 25	p. 39
4. Set Straight Matter	p. 46	p. 29	p. 40–44
5. Take Proof in Proof Press	p. 48	p. 36	p. 56
6. Take a Stone Proof	p. 49	p. 35	p. 55
7. Read Proofreaders' Marks	p. 51	p. 37	p. 83
8. Make Corrections	p. 54	p. 38	p. 58
9. Justify a Line	p. 47	p. 30	p. 44–46
10. Dump Stick	p. 56	p. 32	p. 51
11. Tie Up a Form	p. 58	p. 33	p. 53
12. Distribute Type	p. 60	p. 41	p. 61
13. Put Away Leads and Slugs	p. 62	p. 18	p. 63
14. Care For Ink Slab	p. 64	p. 174	
15. Set Display Type	p. 65	p. 87	p. 175
16. Wash Type and Ruler	p. 66	p. 37	p. 57
17. Lay a Case	p. 67	p. 21	p. 61
18. Clean a Case	p. 68		p. 61
19. Distribute Pi	p. 122	p. 42	p. 61
20. Layout Job	p. 83	p. 96	p. 144
21. Place Furniture in Form	p. 85	p. 147	p. 92
22. Lock Type in Galley With Reglet	p. 72	p. 144	p. 53
23. Read and Mark Proof	p. 74	p. 37	p. 83–87
24. Lead Out Type	p. 75	p. 18–19	p. 172
25. Get Job Specifications	p. 79	p. 51–137	p. 176–178
26. Set Two Color Forms		p. 132–137	p. 217
27. Tie a Form	p. 87	p. 34	p. 53
28. Lock Form in Chase	p. 85	p. 147–155	p. 88–93
29. Oil Press	p. 97	p. 189	p. 108
30. Ink Press	p. 98	p. 189	p. 111
31. Wash Up a Press	p. 99	p. 190	p. 109
32. Mix Inks	p. 143	p. 207–203	p. 121
33. Feed a Press	p. 100	p. 184–194	p. 115
34. Put on Grippers	p. 88	p. 168	p. 106
35. Put Form in Press	p. 89	p. 174	p. 112
36. Remove Form From Press	p. 91	p. 174	p. 112
37. Put on a New Tympan	p. 92	p. 181	p. 113–114
38. Set Gauge Pins	p. 93	p. 182	p. 114
39. Regulate Make-Ready	p. 96	p. 183–180	p. 113
40. Figure Paper	p. 101	p. 225	p. 206
41. Jog Paper	p. 105	p. 225	
42. Count Sheets of Paper	p. 102	p. 225	
43. Cut Paper Stock	p. 103	p. 224	p. 206
44. Print a Cut	p. 142	p. 191	p. 286
45. Over Run Type	p. 55	p. 31	p. 48
46. Use Quotation Marks	p. 70	p. 31	p. 76–201
47. Set Tabular Matter	p. 71	p. 124	p. 132
48. Set a Rule Blank	p. 73	p. 167–192	p. 132–143
49. Punch and String Labels			
50. Stitch Booklets			
51. Hand Fold	p. 108	p. 224	
52. Tab Stock	p. 106		

YOUR ATTENTION, PLEASE

Robert Lloyd Cantor, the author of an article in November's issue, entitled "Expanding Curricula With Industrial-Arts Plastics Course," described a program that existed at the time the article was submitted, but which may not be in practice or operation today.

THE MANUAL ARTS PRESS CHANGES NAME

PAUL VAN WINKLE

Editor, Chas. A. Bennett Co., Inc.

Peoria, Ill.

In tribute to its founder, the late Charles A. Bennett, and in celebration of its fiftieth anniversary, one of the oldest firms in publishing for the industrial-arts field announces a change in its corporate name.

On October 1, 1949, The Manual Arts Press, Peoria, Ill., became Chas. A. Bennett Co., Inc.

To the old-timers and many of the younger men of industrial education the new name, Chas. A. Bennett Co., Inc., should be accepted

Directors of the Chas. A. Bennett Co.

Left to right: Richard H. Simpson, vice-president and treasurer; Paul H. Van Winkle, editor; Laurens L. Simpson, president and chairman of the board; Minnie M. Deeche, secretary; and Howard M. Simpson, advertising manager. The founder of The Manual Arts Press, Charles A. Bennett, is shown in his last photograph, on the wall above the fireplace

as easily as the old. Charles A. Bennett is still referred to as the "grandfather" of the industrial-arts movement in the United States. As the publisher of the first teacher-training magazine, and pioneer of educational training in the manual arts movement, he made The Manual Arts Press almost a synonym for his own contribution to the school-shop program.

Ever since his passing, the company has been under the leadership of Laurens L. Simpson, president, who, for over 42 years, managed the business affairs in very close association with the founder.

After Charles A. Bennett had established the department of manual arts at Bradley Polytechnic Institute, Peoria, in 1890, he felt the need for a professional magazine addressed exclusively to manual training teachers and students of shop teaching. Consequently, he and Edward O. Sisson on the Bradley faculty scraped together enough money to get out the first issue of *Manual Training Magazine*, October 1, 1899. The printing was done at the University of Chicago Press.

After two years of publication, the tiny firm of Bennett and Sisson was $220 in the red. Whereupon Sisson withdrew and Bennett carried on alone.

In 1903 Bennett transferred the production headquarters of the magazine from the University of Chicago Press to Peoria, where printing rates were lower. The imprint "The Manual Arts Press" appeared then for the first time on the title page of the *Manual Training Magazine*. At the same time, associate editors were added as follows: Charles S. Richards, professor of manual training, Teachers College, New York City; Dr. James P. Haney, supervisor of manual training, Public Schools, New York City; and Charles F. Warner, principal of Technical High School, Springfield, Mass.

Between 1903 and 1908 some of the series of articles being printed in the magazine seemed suitable for binding in a permanent form. Therefore, the professor-editor-publisher brought out collections of problems in woodworking and, eventually, in 1908, *Essentials of Woodworking*, by Ira S. Griffith. This was the first textbook for school-shop courses published in the United States. Its success was instantaneous. In fact the future of the organization probably hinged a great deal upon the publication of *Essentials of Woodworking*.

By 1907 the magazine had become a bimonthly, and William E. Roberts, then supervisor of Manual Training, Cleveland, Ohio, took the place of Dr. Haney on the editorial board. In 1909, The Manual Arts Press was incorporated, and in the same year Dr. William T. Bawden, who was teaching at the Illinois State Normal University, became managing editor. Between 1911 and 1930 such men as Frank M. Leavitt of the University of Chicago; Arthur D. Dean, New York State Education Department; Louis Gustafson, Superintendent Ranken Trade School, St. Louis; Robert W. Selvidge, University of Missouri; William L. Hunter; Emanuel E. Ericson, now of the University of California system; Frederick H. Evans of Rochester Mechanics Institute; John F. Friese; Albert F. Siepert; Harry Wood; and others served as active members of the staff.

Meanwhile, in 1919, the affairs of The Manual Arts Press had expanded to such an extent that Bennett resigned his position at Bradley Tech. Following this act the most robust period in the history of the magazine began. The name of the magazine was changed to *Industrial Education Magazine*. The page size was enlarged, and advertising methods were greatly improved.

During the 1920's, The Manual Arts Press published the works of Selvidge, Ralph W. Polk, Edward Berg, James S. Daugherty, and the famous Bennett Histories themselves.

The Home Economics News

In 1929 a magazine in the home-economics field was launched under the name of *The Home Economics News*. At the same time, the depression hit our country. Somehow, The Manual Arts Press survived, however, and *Industrial Education Magazine* continued through the worst years of the depression, most of the credit belonging to the managing ability of Laurens L. Simpson.

Finally, in 1939, because of ill-health and the toll of the years, Bennett retired the magazine.

Since that time The Manual Arts Press has been strictly a book publishing house. Strangely enough, however, letters still come in, ten years later, asking about the magazine and offering contributions to its pages.

As a teacher, writer, editor, and publisher, Charles A. Bennett was without counterpart in his chosen field. It is therefore with great pride that the Chas. A. Bennett Co., Inc., takes over where The Manual Arts Press left off.

All officers of the new corporation are the same as before, and facilities of the organization have not been changed. Mail addressed to The Manual Arts Press will receive the customary courteous attention by members of the Chas. A. Bennett Co. Books of the firm will gradually be changed over to bear the Bennett Co. imprint as new printings are made.

Association News

A.V.A. CONVENTION

The week of December 4 to 10 should be set aside by all those connected in any way with industrial arts and vocational education to attend this national convention. It is impossible, of course, for all teachers to get away from their work during this week. However, those who can get permission to attend should do so, because, at this convention they will meet the leaders in their field of education; see excellent displays of the materials, tools, and equipment which are used in the school shops; have a chance to examine the school shops of the exhibit city, and meet the men who teach in them; and acquire some of the enthusiasm of the men who appear on the various programs. Besides all of this, fine friendships can be formed at these conventions. Don't overlook these opportunities.

The following will give you a preview of a few things that are offered at this convention:

Industrial Education Section

Monday, December 5, 10:00 a.m. National Association of Industrial Teacher Trainers. Presiding: Homer J. Smith, president, National Association of Industrial Teacher Trainers, University of Minnesota, Minneapolis, Minn.

Monday, December 5, 2:00 p.m. National Association of State Supervisors of Trade and Industrial Education. Chairman: Robert M. Reese, president, National Association of State Supervisors of Trade and Industrial Education; State Supervisor of Trade and Industrial Education Service, Columbus, Ohio.

The subjects to be discussed are: "The Junior College Movement and Its Implications to Trade and Industrial Education"; "An Experiment in Training Trade Teachers"; and "Results of the Further Study of the Diversified Occupations Program."

Monday, December 5, 2:30 p.m. The National Association of Industrial Teacher Trainers will hold a meeting under the chairmanship of Homer J. Smith. Other meetings of this section will be held on Tuesday, December 6, 9:30 a.m., 2:00 p.m., and on Wednesday, December 7, at 9:30 a.m.

On Friday, December 9, 12:30 p.m., the National Association of Industrial Teacher Trainers will have a luncheon meeting.

Industrial Arts Section

Wednesday, December 7, 9:00 a.m. A good program of industrial arts. Chairman: Shriver L. Coover, director of industrial arts teacher education, State Teachers College, California, Pa. The subjects to be discussed are: "The Industrial Arts Teacher Studies His Pupils"; "The Industrial Arts Teacher Studies His Community"; and "The Industrial Arts Teacher Studies His Curriculum."

Wednesday, December 7, 2:00 p.m. Hobby possibilities for industrial arts. Chairman: Frank C. Moore, A.V.A. vice-president for industrial arts education, and director of industrial arts education, Cleveland Public Schools, Cleveland, Ohio. The subjects to be presented are: "Silversmithing," and "The Student Workshop."

At 3:30 p.m., the industrial arts sectional business meeting will be held.

Thursday, December 8, 9:00 a.m. Supervision. Chairman: Armand G. Rehn, director of practical arts, Newark, N. J. Subjects to be discussed are: "In-Service Training Through Supervision," and "Supervision Presents the Industrial Story."

On Friday, December 9, at 9:00 a.m. Teaching by Television will be the theme and Lentz D. Gold, supervisor of industrial arts, Atlantic City, N. J., will be the chairman. The following subjects will be discussed: "Organized Labor and Vocational Education"; "Management and Vocational Education"; and "Vocational Technical Education." The discussion will be led by John A. McCarthy.

Wednesday, December 7, 2:00 p.m. "Organization for Vocational Organization" will be discussed by a panel who will present various views on the "School vs. the Segregated Vocational School."

Wednesday, December 7, 2:00 p.m., will be devoted to talks on "Planning Vocational School Buildings, Shops and Laboratories."

Wednesday, December 7, 2:00 p.m. A panel will discuss "The Education of the Sixty Per Cent — A Life Adjustment Program of Education."

At another session on Wednesday, December 7, 2:00 p.m., "Vocational Education for Out-of-School Youth" will be studied. Chairman: J. Graham Sullivan, director of curriculum, Contra Costa Junior College District.

The theme of the addresses on Thursday, December 8, 2:00 p.m., will be "The Place and Function of Private Trade Schools in a Complete Program of Vocational Education."

On Thursday, December 8, 2:00 p.m. "Training Within Industry" will be the burden of the panel discussion.

On Thursday, December 8, 2:00 p.m., "Training Commercial Photographers" will be discussed. "Vocational Education Through the Co-operative Part-Time Diversified Occupations Program"; "Practical Nurse Education"; and "Developing New Educational Opportunities for Girls and Women" are other subjects that will be discussed at various sectional meetings on Thursday, December 8 at 2:00 p.m.

On Friday, December 9, 9:30 a.m., the theme for the meeting will be "Vocational Education Trains for the Garment Industry," and the views of labor, management, and the school on this subject, will be studied.

At other sessions on Friday, December 9, 9:30 a.m., "Apprenticeship and Apprentice Training"; "Trade Preparatory Training for the Industrial Chemistry Field"; "Recent Developments in Veteran Training"; "Girls and Women in Industry"; "Supervisory Training"; and "Automobile Mechanics" will be studied and discussed.

The sectional meetings on Saturday, December 10, 9:30 a.m., will study "Visual Aids in Vocational Education"; "Institutional Training"; "Public Vocational and Secondary Schools"; "Key Problems of Graphic Arts Education"; "Testing in Vocational Education"; "Improving Instruction in Treatment of Metals"; and "Hotel and Restaurant Training."

♦ The Ohio Vocational Association meeting was held on September 23 and 24.

State director of vocational education, Dr. Joseph R. Strobel, presented his annual report at the opening session. Dr. R. W. Gregory, assistant commissioner for vocational education, was the principal speaker.

Officers for the coming year are: Mabel J. Scott, High School, Waverly, Ohio, president; Margaret Spicer, Springfield, Ohio, vice-president; and George L. Brandon, Ohio State University, secretary-treasurer.

♦ The Industrial Education Section meeting of the Maryland State Teachers Association was held at Broadway Junior High School Auditorium, Baltimore, Md., on October 21, 1949.

The theme of the discussion was "Safety in the School Shop and Industry."

W. W. MacVicar, assistant to general manager, Bethlehem Steel Company, Sparrows Point Plant, spoke on "Function of a Safety Program in a Large Industry."

Robert Young, superintendent of the experimental department, the Glenn L. Martin Company, gave an address on "What Industrial Safety Practices Can Be Used in the School Shop."

D. R. Henry, placement and safety department, Western Electric Company, discussed "Methods of Safety Instruction."

♦ The New England Industrial Arts Association held its annual convention in Providence, R. I., on November 4 and 5.

Emanuel E. Ericson, professor of industrial arts, Santa Barbara College, University of California, Santa Barbara, Calif., was the main speaker at the banquet meeting on November 4, and also at the luncheon on November 5.

After the luncheon on Friday, a symposium was held on the subject of "Industrial Arts in the Life Adjustment Program." This subject was further expanded in the round-table discussion which followed.

On Saturday morning, round-table discussions started at 10 o'clock. The business meeting was held at 11:30 and the luncheon at 12:30.

♦ The Fifth Annual Oklahoma State Industrial Arts Clinic was held at Lake Carl Blackwell, Stillwater, Okla., during the week of May 30 to June 3, inclusive. As has been the custom in the past, the general theme of the Clinic was "Design for Industrial Arts" with special emphasis on the design of general metalwork projects. The guest lecturer and adviser for the drawing of usable projects was Dr. John L. Feirer, associate director of industrial arts education, Western Michigan College of Education, Kalamazoo, Mich. Dr. Feirer lectured both morning and afternoon during the first three days of the Clinic. Others appearing on the Clinic program were Dr. DeWitt Hunt and Professor C. L. Hill of Oklahoma A. & M. College and J. W. Bollinger of Roosevelt Junior High School, Tulsa, Okla.

There were men registered from the states of Kansas, Texas, Arkansas, New Mexico, Nebraska, Illinois, and Pennsylvania.

The Industrial Arts Clinic is sponsored by the Oklahoma Industrial Arts Association and has been directed by Dr. Hunt of Oklahoma A. & M. The Association voted to accept the invitation of the University of Oklahoma officials for the Sixth Annual Clinic for the spring of 1950. Dr. Robert A. Hardin of the University will direct the Clinic.

The drawings made by those enrolled at the Clinic for the first four years have been reproduced and totals approximately two hundred sheets. These may be obtained for 50 cents per set by writing to the Industrial Arts Education Department, Oklahoma A. & M. College, Stillwater, Okla.

♦ The annual business meeting of the Oklahoma Industrial Arts Association was held at Lake Carl Blackwell, Stillwater, Okla., on June 1, 1949. This meeting was held as an evening meeting of the Oklahoma State Industrial Arts Clinic which is one of the projects sponsored by the association. The O.I.A.A. sponsors chapters of the state association in the state colleges which offer industrial-arts training. The state schools that have organized chapters are Oklahoma A. & M. College, Stillwater; University of Oklahoma, Norman; Central State College, Edmond; Southwestern State College, Weatherford; and Northwestern State College at Tahlequah. Other schools have signified their intentions of organizing chapters. The O.I.A.A. publishes three News Bulletins each year that are sent to all teachers of shop in the state.

The association sponsors several meetings during the state convention of the Oklahoma Education Association. They are meetings of the Oklahoma State Advisory Committee, Research Committee meetings, annual banquet and professional meeting, and industrial arts sectional meetings. These are all open meetings for any one interested in industrial-arts education.

The present officers of the association are: president, John Cermak, Southwestern State College, Weatherford; vice-president, Robert K. Phelps, Carnegie High School, Carnegie; secretary-treasurer, Cary L. Hill, Oklahoma A. & M. College, Stillwater; directors, B. H. Thomas, Central High School, Oklahoma City; Asbury Smith, Central State College, Edmond; and Richard Kisner, Central High School, Tulsa.

♦ The Connecticut Industrial Arts Association held its annual fall conference in the Y.W.C.A. Ballroom, New Haven, Conn., on Friday, October 28, 1949, at 12:30 p.m.

Paul Collier, chief of the Bureau of Youth Services, State Department of Education, was the main speaker. The theme of the conference was "Evaluating the Modern Program of Industrial Arts." Vernon Stapleford of Bassett Junior High School, New Haven, was the program chairman.

♦ The 1949–50 Epsilon Pi Tau officers of the Beta Chapter at Ball State Teachers College are: Ralph Holman, president; Robert Tash, vice-president; Quin Dyer, secretary; and Don Weber, treasurer. Officers of the Industrial Arts Club of the Ball State Teachers College are: Frank Moore, president; Lewis Powell, vice-president; Maurice Mann, secretary-treasurer; and Charles Ashley and Jules E. Elzey, publicity.

♦ On November 14 and 15 the Directors and Co-ordinators of Vocational Education of the State of Indiana will meet on the Ball State Teachers College campus under the direction of H. G. McComb, state director of industrial education. This group is sponsoring meetings in the Arts Building Lounges during the afternoon of November 14 and all day November 15. A general meeting is scheduled in Recital Hall of the Arts Building for the evening of November 14.

NEW SERVICES SPEED WORK!

New Stencil Sheet for Handwriting!

No typewriter needed for clear copies of lessons, outlines, tests. New stencil sheet ruled for easy writing. Prepare it anywhere—at your desk, at home.

Mimeographing Is Easy to Learn!

This new textbook, "Fundamentals of Mimeograph Stencil Duplication," is self-teaching. Every step described and illustrated. Edited by Agnew (NYU) and Cansler (Northwestern).

Tracing Pages Add Interest!

More than 400 easily traced drawings by professional artists give life and attractiveness to school newspapers, programs, bulletins, and classroom material.

Special Stencil Sheets Help School Editors!

These stencil sheets have guide lines for two or three column school newspapers. Sharpen the appearance and quality. Invaluable in putting out a professional looking paper in less time.

Give Them ALL a Chance to Learn

You can give each of your pupils a copy of the lesson material, project instruction, or detail sheet, when you use an A. B. Dick mimeograph.

Here's a fast, easy way to produce a few or thousands of copies of anything written, typed, or drawn. Exact duplication makes line work and text easy to read, with sharp, black-on-white copies.

This versatility can increase the effectiveness of your teaching—and at small cost, too. So take a few minutes to find just the model you need in the complete line of A. B. Dick mimeographs. For use with all makes of suitable stencil duplicating products. Ask your local A. B. Dick Distributor for more information, or send in the coupon below.

Mimeographing Is BALANCED Duplicating

A.B.DICK

. . . the first name in mimeographing

Mail this Coupon for more information

New Services Speed Work!

A. B. DICK COMPANY, Dept. IA-1249
5700 W. Touhy Avenue, Chicago 31, Ill.

Please send me more information about time-saving A. B. Dick mimeographs and your new services for schools.

NAME _____

SCHOOL _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Millers Falls Presents

THE BIGGEST DRILL VALUE EVER OFFERED!

Sensational new No. 912 General Utility ½" Drill

CHECK THESE GREAT FEATURES

✔ **LIGHT WEIGHT** — Heft the new Millers Falls No. 912 and you'll notice its first big point of superiority. Ruggedly built, yes — yet it weighs only 8 lbs.

✔ **DESIGNED FOR PERFORMANCE** — Next, note the famous No. 33B Jacobs Key Chuck. Feel the fine balance and palm-fitting, finger-grip handles that mean extra comfort and control.

✔ **HIGH OUTPUT** — Then, press the trigger and see how it operates in steel or hard wood. No stalling . . . no overheating. The No. 912 has more power than any comparable drill on the market.

✔ **QUALITY CONSTRUCTION**—Mechanically and electrically, you'll find the No. 912 is built for long service with high precision gears, large bearings, sturdy die cast aluminum alloy frame. Heavily insulated throughout, it carries full Underwriter's Laboratories approval.

Try the new No. 912 in your school shop. We sincerely believe it represents the greatest dollar value of any drill ever made.

$35

IT'S A BEAUTY!

To convert the No. 912 Drill into a high accuracy drill press, we've designed this rugged No. 2912 Drill Stand. An outstanding value at only $16.80 list.

See the No. 912 at your supplier today.

MILLERS FALLS COMPANY — MILLERS FALLS TOOLS SINCE 1868 — GREENFIELD MASSACHUSETTS

Personal News

♦ Douglas B. Hobbs, in charge of motion pictures, educational and technical information, and activities of the public relations and advertising department of Aluminum Company of America, died early Tuesday morning, October 11, 1949, in the Waldorf-Astoria Hotel in New York of a heart attack. He was 49 years of age. At the time of his death, he was attending a convention of the Association of National Advertisers.

Mr. Hobbs was graduated from the University of the South, Sewanee, Tenn., in 1920, and for the next two years did graduate work in metallurgy at Lehigh University. He became affiliated with the Aluminum Company of America in 1923, as a research metallurgist in the Cleveland (Ohio) Branch of Aluminum Research Laboratories. A year later, he was transferred to the metallurgical division of the company's Cleveland Works, and on June 1, 1929, to the public relations department in Pittsburgh.

During his twenty years in the public relations department, Mr. Hobbs wrote numerous technical and general articles on aluminum for various magazines, and was the author of two books, *Aluminum: Its History, Metallurgy, and Uses, with Projects for the School and Home Shop*, and *Working With Aluminum*, both of which were published by the Bruce Publishing Company.

He was the producer of numerous outstanding motion pictures for the Alcoa Film Library, including the well-known technicolor productions, "Unfinished Rainbows" and "Curiosity Shop," which have been seen by audiences totaling more than thirty million people.

♦ Amos G. Williams has been appointed professor and head of the department of industrial arts at Southeast Missouri State College, Cape Girardeau, succeeding Dr. Kenneth L. Bing who has accepted the chairmanship of the industrial-arts department at East Carolina Teachers College, Greenville, N. C.

Mr. Williams has been engaged in industrial teacher education since 1935, having been instructor of industrial arts at Westmar College, Le Mars, Iowa, for six years and associate professor of industrial arts at Nebraska State Teachers College, Wayne, for three years, and associate professor of industrial arts in the department at Cape Girardeau, for three years. He was also instructor of architectural drafting at Maine Township High School, Des Plaines, Ill., for one year.

Mr. Williams received his undergraduate training at Westmar College and was granted the master of science degree at Iowa State College, Ames. He has further studied at The Stout Institute, Menomonie, Wis., and the University of Colorado, Boulder.

♦ William Graf, Jr., has been appointed instructor in mechanical engineering at Illinois Institute of Technology.

Mr. Graf formerly was an instructor in technical drawing at Illinois Tech from September, 1945, to February, 1948. He also served as associate engineer in the Mechanics department of the Armour Research Foundation of Illinois Institute of Technology from May, 1942, to October, 1947.

He is a native of Chicago and was graduated from Carl Schurz high school in 1933. He received his bachelor's degree from Armour Institute of Technology in 1939, and master's degrees in both chemical and mechanical engineering at Illinois Tech in 1947.

♦ Dr. Edward M. Corson, senior physicist at Armour Research Foundation of Illinois Institute of Technology, has accepted an invitation to lecture in the graduate school, do research work, and participate in several international conferences at the University of Edinburgh, Scotland.

Corson will serve on the faculty of the graduate department of mathematical physics. The subject of his research work will be "Field Theory of Elementary Particles," which deals with the properties of the atom.

Corson, who is 27 years old, received his Ph.D. degree in mathematical physics from Johns Hopkins university. During World War II he worked for the Atomic Energy Commission. He spent 1945–48 at the Institute for advanced study, Princeton University, where he completed two books on advanced quantum mechanics which are being published in England.

♦ Dr. H. Robert Kinker has recently been appointed to the faculty of Indiana University as associate professor of education. He will work with Dr. Melvin S. Lewis in the areas of vocational education and vocational guidance. Dr. Kinker received a B.S. degree in vocational education from the University of Toledo in 1938, an M.A. degree from New York University in 1942, and an Ed.D. degree from the same institution in February, 1949.

During the past five years he has been a member of the University of Toledo faculty, serving as teacher-trainer and foreman-trainer for northwestern Ohio. Prior to his appointment at Toledo in 1944, Dr. Kinker was a vocational instructor. He taught automotive mechanics in the Mansfield, Ohio, Senior High School from 1932 to 1940, and in the Saunders Trade School, Yonkers, N. Y., from 1940 to 1944.

Dr. Kinker is a member of the various professional organizations, including the American Vocational Association, the National Guidance Association, the N.E.A., and Phi Delta Kappa.

♦ Prof. Thomas L. Hankins, head of the department of industrial education at the University of Kentucky since 1944, has been named director of the university's northern extension center at

(Continued on page 18A)

Extra-safe for students!

DELTA® 20" BAND SAW

Practical features like these have been built into this big Delta 20" Band Saw, to help the student do better work — and do it more safely:

Ball-bearing blade guides — adjustable with micrometer accuracy — reduce blade breakage.

Welded steel cabinet — a single unit — protects student from working parts.

Blade above table is guarded right to point of cutting.

Statically-balanced wheels run on lubricated-for-life ball bearings.

Aluminum wheels reduce flywheel action after motor is shut off.

Foot brake on lower wheel enables student to bring machine to a quick stop (after power is shut off) before leaving machine.

Switch can be padlocked, to prevent unauthorized use.

Your nearby Delta distributor would like to show you the Delta 20" Band Saw. See it on his sales-floor soon. Or, send coupon for free Catalog A-48. *(Saw also available through Crescent Division distributors.)*

POWER TOOL DIVISION
ROCKWELL MANUFACTURING CO.
MILWAUKEE 1, WISCONSIN

(Time payments can be arranged. See your Delta Dealer.)

Look for the name of your Delta distributor under "Tools" in the classified section of your telephone directory.

D-20A

TEAR OUT COUPON AND MAIL TODAY!

POWER TOOL DIVISION, ROCKWELL MANUFACTURING CO.
660N E. Vienna Avenue, Milwaukee 1, Wisconsin

Send me free copy of Catalog A-48 describing Delta 20" Band Saw.

Name.....
Position.....
School.....
Address.....
City.....(.....) State.....

Over 100,000 of Kester flux-core Solder Types and Sizes Available

Standard for Industry Since 1899

POSITIVE FLUX UNIFORMITY

Every student should be acquainted with the following facts about Kester Flux-Core Industrial Solders. Made with a single core or opening. 68 different strand sizes available. Core sizes ranging from an opening that contains ½ of 1% to 7% of flux by weight. All practical alloys ranging from all lead to all tin. 8 types of major fluxes.

LABORATORY CONTROLLED

FREE: Kester's New Technical Manual

"SOLDER and Soldering Technique." A complete analysis of the properties and application of soft solder alloys and soldering fluxes. Get your copy now.

1899 50th Anniversary 1949

KESTER SOLDER

KESTER SOLDER COMPANY

4201 Wrightwood Avenue, Chicago 39, Illinois

Factories Also at

Newark, New Jersey • Brantford, Canada

PERSONAL NEWS

(Continued from page 16A)

Covington, Ky., replacing Dr. William C. Wesley who resigned.

The new extension center director has been associated with the U. K. College of Education faculty since 1938 when he was appointed instructor of industrial education. Prior to joining the University staff he had several years' experience in administrative and teaching positions in the public schools of Mason and Shelby Counties, Ky.

He is widely known throughout the state for his organizational work in establishing adult education training programs for various industrial concerns, including the L. & N. Railroad, Rural Electrification Administration, and the U. S. Army Signal Corps.

Under Prof. Hankins' direction, the Northern Kentucky Extension Center now offers a complete freshmen and sophomore liberal arts course. Students living in that area may complete two years of college work before transferring to the main campus at Lexington to finish requirements for a degree. A number of adult education courses also are offered at the Center.

♦ L. W. Yoho, instructor of industrial arts, Ball State Teachers College, attended the summer session at Indiana University doing work toward his doctor's degree. At the completion of the summer session, he transferred to two weeks of active duty in the Aerology Division at the U. S. Naval Reserve at Glenview Air Base, Glenview, Ill.

♦ William McKnight, Jr., of McKnight and McKnight Publishing Company, Don Jesseman from Stanley Rule and Level Company, and Kenneth G. Eckley of Brodhead-Garrett visited the industrial arts department of Ball State Teachers College during the summer session.

♦ Oliver C. Bumb, Henry A. Loats, and Alan R. Pawelek, all associate professors of the industrial arts department, Ball State Teachers College, passed their oral and written examinations toward the doctor's degree during the spring and summer sessions. All three men are working on research problems related directly to their teaching field. Oliver Bumb is working on a student teaching problem; Henry Loats on a problem related to industrial arts for elementary grades; and Alan Pawelek on an air-age problem.

♦ Melvin Bertram, printing teacher at Bosse High School, Evansville, Ind., has the distinction of having a book on "High School Journalism" dedicated to himself. The authors of the new book are Dr. Harold Spears, assistant superintendent of schools in San Francisco, Calif., and Dr. C. H. Lawshe, professor of psychology at Purdue University. The dedication reads:

"This book is dedicated to Melvin Bertram, master teacher and master craftsman of the Evansville, Ind., public schools. There is always a good printer behind every good high school newspaper. As a result of our own experience we can say that Mel Bertram is an outstanding example."

♦ Dr. William J. Micheels of the department of industrial education, University of Minnesota, Minneapolis, Minn., left for Germany where he will serve as visiting expert on the training of demonstration school staff projects in Bavaria. He will return to this country some time in January, 1950.

♦ S. Kirklen Collins has been appointed to the staff of the Accident Prevention Department, Association of Casualty and Surety Companies, 60 John St., New York 7, N. Y.

Mr. Collins is assigned to the department's safety education division, and will devote most of his time to the field of high school driver education, in connection with the association's rapidly expanding program of training teen agers in safe driving practices.

(Continued on next page)

PERSONAL NEWS

(Continued from previous page)

♦ H. R. SALISBURY has been appointed president of Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y. Those appointed vice-presidents are: H. F. Henriques (general sales); J. J. Lincoln, Jr. (railroad sales and sales services); S. B. Stouffer (distribution); N. L. Wisser (field office management). Other officers of Air Reduction Sales Company are: C. G. ANDREW, vice-president (operating); J. D. GUNTHER (secretary); W. WINTERS (treasurer); and J. E. SLATER (controller).

♦ RICHARD J. SUTTON has accepted a position in Dauphin, Manitoba, Canada. He is teaching in the Dauphin Collegiate and Technical Institute. Mr. Sutton has charge of the general metal shop, which covers machine shop, forging, gas and arc welding, sheet metal, foundry, and auto mechanics.

♦ LAURENCE BEHRENDS has recently been appointed industrial-arts instructor at Western Illinois State College, Macomb, Ill.

♦ DONALD LEIN has taken a position at Reuben Post Halleck Hall, Louisville, Ky. This is a 6-year junior-senior high school which was opened in 1937. It is the newest and largest school in that city's public school system.

♦ WILLARD DOORES, printing instructor, Chanute, Kans., worked at the Chanute Tribune as a linotype operator during the summer.

♦ FRANK W. SCOTT, day trade auto-mechanics instructor, Argentine High School, Kansas City, Kans., was employed at the Chrysler-Plymouth Agency as a mechanic during the past summer.

♦ J. C. WOODIN, director, industrial and adult education, Wichita, Kans., has been appointed to the board of directors of the Wichita Manufacturers' Club.

♦ CHARLES V. CRISSMAN, instructor of woodworking at Chanute, Kans., has been appointed to have charge of the evening adult education program. He succeeds Jim Gilbreath, who has handled the program for nearly ten years. Mr. Gilbreath is recovering from an illness which has caused him to give up all activities excepting those in the day school.

♦ L. E. FALGREN, director, industrial arts and vocational education, Kansas City, Kans., taught in the trade and industrial instructor training program, New Mexico Highlands University, Las Vegas, for six weeks during the past summer.

♦ RAMON L. CHARLES has been appointed supervisor of guidance services by the State Board of Vocational Education.

♦ C. R. WILKEY, state supervisor of agricultural education of Arkansas, has been elected president of the Southern Association of Agricultural Engineers and Agricultural Education Workers.

♦ DALE ROBERTS, former supervisor of industrial arts, high school, Mattoon, Ill., has been appointed director of vocational education and practical arts of the Community Unit School District No. 2 of Mattoon, Ill.

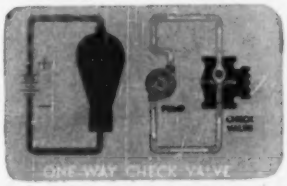
♦ The following men completed the work for the bachelor's or master's degree in the department of industrial education at Wayne University, Detroit, Mich., at the end of the 1949 summer session: Bachelor's degrees — ROBERT CAMERON, JOHN HIJA, RAY KUIPERS, DONALD MOYER, SARKIS PASHIAN, ARAM SAFILIAN, RUBEN SHELL, DAVID WENNER, JACK ZOOK; master's degrees — JOSEPH FRANK CACCAVO, JAMES COTTER, JR., JOHN CUCKOVICH, OSCAR A. FELDEN, J. JAMES HASENAU, DONALD ISAAC LAHTI, GEORGE WILLIAM OLSON, PAUL F. PAYNE, JOHN H. RINGELSPAUGH, JACOB SCHOEPPLER, THEODORE F. STONER, and LESTER A. TWORK.

♦ L. I. JOSSERAND, director of industrial education and vocational drafting instructor at the United Township High School, East Moline, Ill., for 19 years, has been appointed director of industrial education of the public schools at Bloomington, Ill.

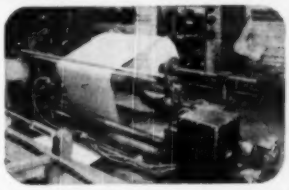
(Continued on next page)

How can you take the MYSTERY OUT OF ELECTRONICS?

See this film and find out!

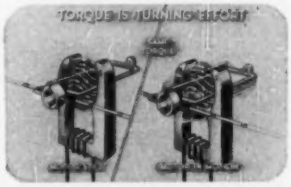


1. INDUSTRIAL ELECTRONICS for "on the job" trainees and students, is the subject of an intensely practical 12-lesson sound slide-film course now being offered by General Electric. Liberal use of easily understood diagrams (above) practically insures that . . .

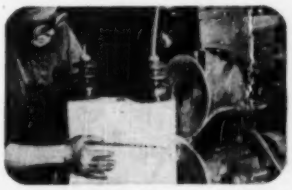


2 . . . students will absorb electronic tube fundamentals quickly and easily. Moreover, this course highlights important electronic applications such as photoelectric surface scanning systems (above). It takes its audience into industry's laboratories, shows how . . .

3 . . . photolighting equipment rotating at 40,000 rpm reveals metal failures (above) in the making! Students are led easily and logically from one "lesson" to the next (12 in all). Reviews precede each lesson. A high point is the subject of electronic motor control.



4. The student is shown visually how a motor operates (above) and how an electronic tube provides stepless speed control. And because he *knows*, he makes a more valuable employee. The vital subject of resistance welding . . .



5 . . . is covered completely. Step by step, the student is given the basic principles and the practical uses (above) for spot, projection, and seam welding. To convince you that this course reduces training costs, we'd like to send you this comprehensive . . .

6. INSTRUCTOR'S MANUAL—FREE! It shows the course's scope and objectives. All twelve lessons are pictured along with the printed narrative. (Complete course with instructor's manual and review booklets—$150.00.) MAIL THE COUPON TODAY!

FREE *to business management!*

General Electric Co., Section B684-16
Schenectady 5, N. Y.

Attach to your business letterhead

Please send me a complimentary copy of the G-E Industrial Electronics Training Course Manual (GES-3330) without obligation.

Name _____ Title _____

Company _____

Street _____

City _____ State _____

GENERAL ELECTRIC

ATF LITTLE GIANT

Widely preferred for

PRINTING *instruction*

Over sixty modern schools already have installed this modern, low-cost cylinder press in their printing departments, and their number is being added to constantly. Safest to operate, simple enough for the novice to handle easily, the ATF Little Giant is capable of the finest automatic cylinder-press quality, printing on any kind of paper from onionskin to 4-ply card. Easy to make ready, quick on get-away. Accessible bed facilitates press changes. A practical, versatile press, taking a 12"x18" sheet but requiring only 20 sq. ft. floor space, that students will meet in shops from Coast to Coast.

Detailed information on this and other ATF equipment for printing departments, as well as complete cooperation in layout and planning, is freely offered.

American Type Founders

Department of Education

200 ELMORA AVENUE, ELIZABETH B, NEW JERSEY

PERSONAL NEWS

(Continued from previous page)

♦ ALAN R. PAWELEK, associate professor of industrial arts, Ball State Teachers College, spent a greater part of the summer teaching graduate work on the Stout Institute campus.

♦ GEORGE H. RUSSELL, former vocational director of Fort Wayne, Ind., died recently after a protracted illness. Under his direction vocational education and industrial arts grew from its infancy to full maturity.

Mr. Russell came to Fort Wayne upon graduation from Western Michigan State Teachers College, Kalamazoo, Mich., in 1911.

He is survived by his wife, two sons, a brother, and three grandsons.

♦ WILLIAM E. CASWELL, formerly on the faculty of the industrial arts department, State Teachers College, Millersville, Pa., passed away January 17, 1949.

♦ M. A. WITTEVRONGEL, vocational machine-shop teacher at the United Township High School, East Moline, Ill., has been appointed director of that school to take the place of L. I. Josserand, who was made director of industrial education at Bloomington, Ill.

♦ ERNEST J. SIMON, director of vocational education of the state of Illinois, was awarded an honorary degree of doctor of laws in recognition of his work in the fields of industrial and vocational education.

♦ RICHARD W. SKULSKI has been awarded an industrial research fellowship at Armour Research Foundation at Illinois Institute of Technology.

Skulski will do graduate work at Illinois Tech and industrial research at the Foundation, each half time, for 21 months. Completion of the work will lead to a degree of master of science in mechanical engineering.

Skulski is one of nine students in various universities and colleges throughout the country who won fellowships at the Foundation.

♦ SYLVESTER EDWARDS is teaching industrial arts in the Carver School at Phoenix, Ariz.

♦ ROBERT E. CALONGE has been appointed teacher of industrial arts at Edinburgh, Ind.

♦ CLARENCE N. DAY will teach industrial arts and will coach at Reynolds, Ind.

♦ PAUL W. HUTH, who taught for 23 years at the Milwaukee Vocational School, died on Monday, July 25, 1949.

After attending Whitewater Normal School and Milwaukee Normal School, he taught in rural schools in Sheboygan and Ozaukee counties. Then he was made principal of the East Milwaukee (now Shorewood) school for a period of six years.

In 1913 he was elected superintendent of the Milwaukee county schools for two terms (1913 to 1917). His term of service at the Milwaukee Vocational School started toward the end of World War I. He retired from that school in 1942.

♦ MARSHALL L. SCHMITT joined the staff as associate professor of industrial arts at North Carolina State College during the winter term. He received the B.S. degree in education from Oswego State Teachers College in 1941. He was granted the M.A. degree from Ohio State University in 1947, and has completed one summer of work toward his doctorate at Penn State College.

Mr. Schmitt taught industrial arts in the secondary schools of New York State, and before entering the service, he was a group supervisor at the Army Air Forces Technical Training School located in Lincoln, Neb. During the war he was in charge of an electrical engineering school at Solomans, Md. During the past two and one-half years, he has been teaching electricity and metals at Oswego Teachers College.

News Notes

♦ School shop membership in the National Safety Council has been lowered from $12 to $7 per annum. Included in the membership are an annual subscription to the National Safety News which gives complete coverage of latest developments in industrial safety, an annual subscription to the School Shop Safety News Letter, "Accident Facts," and a packet of 25 shop safety posters.

Secondly, there is new complete flexibility for the purchase of additional instructional materials to fit local needs and budgets.

♦ Governors from the following states have received bronze plaques honoring their states for progress in the instruction of safe driving in the state's high schools during the school year 1948–49. The plaques were presented by the Association of Casualty and Surety Companies, 60 John St., New York 7, N. Y.

The states that were honored are Connecticut, Illinois, Delaware, South Carolina, Michigan, Massachusetts, and Wisconsin.

♦ A guidance bibliography 1945, on counselor preparation, is obtainable from the Federal Security Agency, Office of Education, Occupational Information and Guidance Service, Washington, D. C.

♦ California's program to encourage safe driving among young people has announced that driver education testing devices will be supplied to every secondary school in the state.

The devices have been turned over free to the State Department of Education by the General Petroleum Corp., 612 S. Flower St., Los Angeles, Calif.

♦ Dennis C. Haley, superintendent of public schools in Boston, Mass., and William Jansen,

(Continued on page 22A)

Students Learn *Faster* with

A SLIDEFILM LIBRARY FOR YOUR SHOP

A wide range of slidefilms, shop-tested and technically correct, is available for industrial education.

Visualization of the student's problems provides one of the most effective teaching tools known. Students *see* each problem clearly, and quickly grasp the solution shown in projected pictures.

Every lesson is covered thoroughly. Quick reviews and questions are used to stimulate class discussion.

Whether you enclose a check or order on approval, be sure you send this coupon now for these modern helps to modern teaching.

The **JAM HANDY** *Organization*

All Prices Plus Sales Tax Where Applicable

THE JAM HANDY ORGANIZATION, 2821 East Grand Blvd., Detroit 11, Michigan

Please enter my order for—

SLIDEFILMS

☐ BASIC SHOP SAFETY	8 slidefilms	$30.00
	Individual slidefilms	4.50
☐ WOODWORKING TOOLS AND MACHINES	14 slidefilms	$51.60
	Individual slidefilms	4.50
☐ ENGINE LATHE	11 slidefilms	$46.50
	Individual slidefilms	4.50
☐ TECHNICAL LETTERING	5 slidefilms	$18.00
	Individual slidefilms	3.75
☐ AUTOMOTIVE MECHANICS (kit 1)	35 slidefilms	$99.00
	Individual slidefilms	3.50
☐ AUTOMOTIVE MECHANICS (kit 2)	35 slidefilms	$99.00
	Individual slidefilms	3.50
☐ BENCH WORK	10 slidefilms	$39.50
	Individual slidefilms	4.50
☐ MACHINING	16 slidefilms	$53.50
	Individual slidefilms	4.50
☐ OXYACETYLENE WELDING	15 slidefilms	$41.50
	Individual slidefilms	3.75
☐ AIRCRAFT ENGINE MECHANICS	24 slidefilms	$69.00
	Individual slidefilms	3.50
☐ AIRCRAFT MECHANICS	47 slidefilms	$135.00
	Individual slidefilms	3.50
☐ AVIATION METALSMITHS	16 slidefilms	$45.75
	Individual slidefilms	3.50

MOTION PICTURES

☐ BEHIND THE SHOP DRAWING	2 reel, 16 mm, safety stock with sound	$66.00
☐ USE AND CARE OF HAND FILES	2 reel, 16 mm, safety stock with sound	$66.00
☐ HAND SAWING	2 reel, 16 mm, safety stock with sound	$66.00
☐ AIRCRAFT RIVETING	Combination slidefilm and motion picture with sound 2 reel, 16 mm, on safety stock	$66.00
☐ OXYACETYLENE WELDING	2 reel, 16 mm, safety stock with sound	$66.00

Name _____ Position _____

Organization _____ Address _____

City _____ Zone _____ State _____

Prices F.O.B. Detroit—subject to change without notice. Write for further information about Jam Handy Films. These films may be purchased through a nationwide dealer organization.

SHELDON

You really need a precision milling machine for a complete course in shop practice

For floorspace occupied, this milling machine will add more teaching capacity to a school shop than any other piece of equipment. Occupying a floorspace of only 18" x 24", requiring only 29" x 39" including operating space, and moderate in price, a SHELDON No. 3000, Size "0", Milling Machine will holds its extreme accuracy even under "student abuse." It can be bought as a basic machine to come within a budget, and, power feeds, universal heads, etc., added at any time. It is a safe tool, is completely enclosed. All speed changes and feed changes are made by external hand wheels and levers from the normal operating position.

AVAILABLE ACCESSORIES AND ATTACHMENTS

- POWER HEAD
- UNIVERSAL HEAD
- DIVIDING HEAD
- COOLANT SYSTEM
- ROTARY TABLE
- SWIVEL VISE
- DRIP POT OILER

Write for Specification Sheet and Catalog

SHELDON MACHINE CO. Inc.

Manufacturers of Sheldon Precision Lathes • Milling Machines • Shapers
4244 N. KNOX AVENUE • CHICAGO 41, ILLINOIS, U. S. A.

NEWS NOTES

(Continued from page 20A)

superintendent of public schools in New York City, have accepted invitations to serve as members of the advisory board of the Fisher Body Craftsman's Guild, General Motors Bldg., Detroit 2, Mich. They will join a group of eight other school superintendents from Detroit, Cleveland, Dallas, Texas, Memphis, Tenn., Pasadena, Calif., St. Louis, Mo., and Seattle, Wash., who serve as advisers to the Craftsman's Guild.

♦ "Training in New York State Industries" by John M. Brophy, and "Apprenticeship in Western New York State" by Edward B. Van Dusen, the first two research bulletins of the New York State School of Industrial and Labor Relations, Cornell University, Ithaca, N. Y. are now available free of charge to New York State residents.

♦ *Life* magazine announces that their editors are issuing the first of a series of film strips in color, based on their researches for Life's History of Western Culture articles, and on other major essays in science and social history. Full use will also be made of the numerous published and unpublished color transparencies by means of which *Life's* color photographers are recording the world's great masterpieces of art, architecture, and archaeology.

Three of the first film strips are *The Middle Ages, Heritage of the Maya,* and *Giotto's frescoes of the Life of Christ,* from the Arena Chapel in Padua. There is a fourth film strip, *The Atom,* also in color.

Life film strips contain an average of 50 frames, and sell for $4.50. Extensive lecture notes accompany each subject. For further information write for the descriptive booklet to *Life* Filmstrips, Time & Life Bldg., 9 Rockefeller Plaza, New York 20, N. Y.

♦ A new series of six-color Teach-O-Filmstrips, "Regional Geography," has just been released by Popular Science Publishing Co., Audio-Visual Division, 353 Fourth Ave., New York 10, N. Y. These Teach-O-Filmstrips were designed for fifth-, sixth-, and seventh-grade geography and social studies.

The following three strips constitute a unit: "Mexican Journey, Parts I, II, and III." Together they provide a comprehensive study of our nearest southern neighboring nation. Fifth strip in the series, "Land of the Mayas — The Yucatan," focuses upon the oldest civilization on our continent, which many consider the most interesting section in Mexico.

"Regional Geography" closes with "Nova Scotia and the Gaspe," an overview of Canada's most fascinating maritime province.

Packaged in a sturdy, book-style file box, the six strips are accompanied by a fully illustrated 36-page Teaching Guide which provides a wealth of background data. Entire kit is $31.50 and is available from local dealers or Popular Science Publishing Co., Audio-Visual Division, 353 Fourth Ave., New York 10, N. Y.

♦ For more than a century, builders have accepted a rule that, if plaster is not to crack, the beam to which the lath is attached must not bend in service more than 1/360th of its length.

Tests of models in which modern materials and methods of attachment were used indicated that the plaster could take as much as six times the stress specified in the old formula without cracking. Structural members selected on the basis of the deflection formula have often been too expensive because of the extra stiffness required.

The complete report may be purchased from the U. S. Department of Commerce, Washington, D. C.

♦ Ball State Teachers College was host to Dr. E. E. Ericson of Santa Barbara, Calif., and Dr. Gordon O. Wilber of Oswego, N. Y., on September 29 through October 1. Both of these leading educators in industrial arts are touring the country visiting teachers colleges with industrial-arts programs for the purpose of collecting data as a solution to problems in industrial arts which they are studying. A meeting, sponsored by the Industrial Arts Club and Epsilon Pi Tau, was scheduled on the evening of September 29 at which Dr. Ericson spoke and after which Gordon Johnson, president of the IIEA, conducted a question period. The same groups sponsored a similar meeting on September 30 at which Dr. Wilber was the speaker and after which Jack Turnbaugh, chairman, Fifth District of the IIEA, conducted a question period. A social hour followed the meeting.

♦ The Connecticut Legislature has passed a bill appropriating seven million dollars for the erection of five new vocational-technical schools in the state of Connecticut. Governor Bowles approved the Bill. The money will be used for building improvements, and equipment at Bridgeport, Danbury, New Haven, Torrington, and Waterbury.

♦ The New England Textile Foundation, 68 South Main Street, Providence, R. I., announces that its annual examination for textile scholarships at the four textile colleges in New England will be given in May this year. Up to 25 freshman scholarships will be awarded to students with the highest marks and other necessary qualifications, and any high school or preparatory school senior or graduate, not over 21 years of age on July 1, 1950, will be eligible to compete. A scholarship has a value of $500 per year and is subject to renewal each year until completion of a four-year course, provided the student has a satisfactory standing. Thus, each scholarship is in effect a $2,000 four-year scholarship.

The scholarship examination will be given by College Entrance Examination Board at various centers throughout the United States, but students wishing to take it should write direct to the Foundation for instructions and should have their

NEWS NOTES

applications filed with the Foundation by February 15, 1950, at the latest.

♦ A record for long-distance college commuting is claimed by members of an evening class in theory and design of hydraulic torque converters at Illinois Institute of Technology.

Myron Schall, 33, Toledo, Ohio, a hydraulic transmission engineer, takes a nine-hour, 470-mile train ride to attend the three-hour class and return home every Wednesday night.

It takes Ralph King, 33, of Peoria, Ill., research supervisor of fluid mechanics for the Caterpillar Tractor Company, two hours and forty minutes to travel the 157 miles each way by train. Four other members of the 17-man class drive 100 miles weekly from Rockford, Ill.

♦ The Jam Handy Organization, 2821 E. Grand Blvd., Detroit 11, Mich., have now available a total of 888 individual visual teaching aids which help instructors in teaching the fundamentals of electricity. They are designed for everyday use in the school shop, for apprentice training, and for foremen's meetings in the electrical, electronics, and allied fields.

♦ The New York State Education Department has recognized industrial arts in its reorganization by the creation of a bureau of Industrial Arts Education which is one of three bureaus in the Division of Industrial and Technical Education. This is the first Bureau of Industrial Arts Education to be organized by a state education department in the country. Frank P. Johnston is director of the division.

The Bureau of Industrial Arts Education includes the following members: Roy G. Fales, acting chief; Arthur F. Ahr, associate education supervisor; Frank C. Campbell, senior education supervisor; Arthur J. Dudley, senior education supervisor; Arnold H. Lamont, senior education supervisor; Raymond Radtke, senior education supervisor.

A second associate education supervisory position has been authorized and will be filled shortly.

The above supervisory staff is charged with the responsibility of encouraging and providing guidance and technical assistance to public schools and communities in the organization and functioning of industrial-arts work in the public schools of the state. Their work includes supervision of existing departments, planning for and promotion of new departments, preparation of instructional material, and review of curriculums, syllabuses, and examinations.

The staff of the Bureau of Industrial Arts Education will consult with educational authorities and carry on supervisory work with more than 2000 teachers working in more than 500 communities in this state.

♦ The Stout Institute Summer Session enrollment reached 656 graduate and undergraduate students for the 1949 season. Of these, 203 were graduate students and 453 were undergraduate students. Thirty-two men and women completed the requirements for the degree of master of science at the close of the summer session.

The graduate men's club comprised 113 members, the largest summer session membership in the club's history. Activities of this group in the summer session included two dinner meetings at which H. W. Teichroew, co-ordinator of St. Paul Vocational Schools, spoke on a phase of vocational education, and Alan R. Pawelek, Ball State Teachers College, presented his slide films on Brazil. The final meeting of the summer was a picnic held at Wakanda Park.

♦ The American Welding Society has elected O. B. J. Fraser, assistant manager, Development and Research Division, the International Nickel Co. Inc., New York, as its president for the year 1949–50. Mr. Fraser took office during the week of October 16 at the Society's annual meeting at Cleveland.

♦ The fall quarter at Ball State Teachers College finds an increased enrollment of industrial-arts students. One hundred twenty-five of these students are freshmen and a very healthy representation of graduate students is found in both the regularly scheduled college classes and Saturday classes.

♦ Leroy Brewington, supervisor of printing, Kansas State Teachers College, Pittsburg, Kans., has installed a new model 34 Display Linotype machine. It handles type up to 60 pt., and has four main and four auxiliary magazines. Mr. Brewington states that the college has one of the only four similar machines in Kansas.

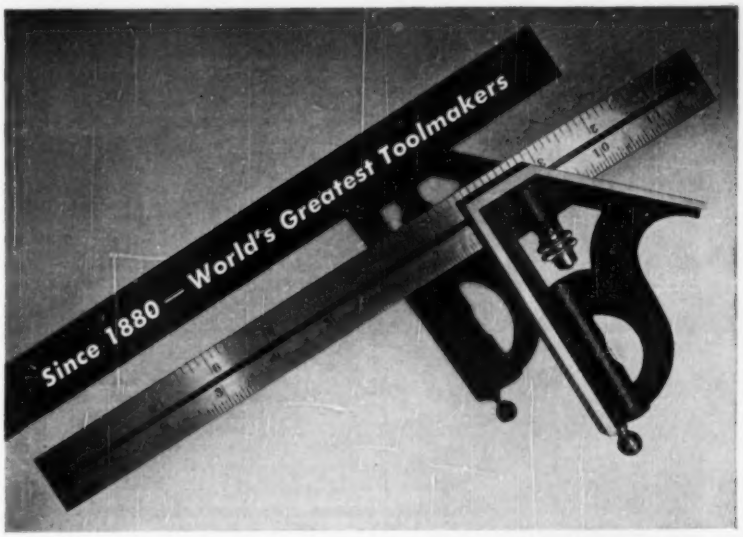
♦ A film entitled "This Moving World," by The Malleable Founders' Society, Union Commerce Bldg., Cleveland, Ohio, presents the story of how malleable iron is made, tested, and used. You are invited to write for this film.

♦ Four new welding films have been made available by The Lincoln Electric Co., 12818 Coit Road, Cleveland 1, Ohio. They are "The Magic Wand of Industry — Arc Welding," "Welding Comes to the Farm," "Design for Arc Welded Structures," and "The Prevention and Control of Distortion in Arc Welding."

♦ Copies of the 1949–50 catalogs from the Frank Paxton Lumber Co., Kansas City 3, Mo., and the Brodhead-Garrett Co., Cleveland 5, Ohio (shop supplies and equipment), are now available. If you have not received your copies, a postcard will bring them to you.

♦ A very notable interest is being displayed in the industrial-arts field in handwork for elementary grades. This is evidenced by the fact that a large number of calls are coming from the field for in-service assistance in handwork for elementary grades. Two of the graduate students

(Continued on next page)



PIONEER in Precision Craftsmanship

THE TOOLS AND RULES FOR PRECISION MEASURING

A valuable aid to instruction, written and edited especially for shop classes. Write for your copy today.

A favorite in 1880, the year it was invented, the Starrett Combination Square is still a favorite today. Like the many other Starrett Tools developed or perfected since then, its lasting value is based on superior quality, craftsmanship and design. When you specify Starrett Precision Measuring Tools you get the most in satisfaction and service for your budget dollar.

Starrett

Standard of Precision

MECHANICS' HAND MEASURING TOOLS AND PRECISION INSTRUMENTS · DIAL INDICATORS · STEEL TAPES · HACKSAWS AND BAND SAWS · PRECISION GROUND FLAT STOCK

Buy Through Your Distributor

THE L. S. STARRETT CO. · *World's Greatest Toolmakers* · ATHOL, MASSACHUSETTS, U.S.A.

Harper

PROMINENT CERAMICS INSTRUCTOR APPROVES HARPER STUDIO KILNS FOR INDUSTRIAL CERAMIC TRAINING

Mr. Edward H. Strong, capable instructor of Ceramics at the New York State College for Teachers, Buffalo, New York, is shown at extreme right with two of his students, inspecting a full load of ware in his Harper Studio Kiln, Model SK-151416. Mr. Strong says

"I have found the Harper Studio Ceramic Kiln an ideal piece of equipment for Ceramic training in the Industrial Arts field.

The kiln is well constructed, with adequate insulation and flexibility of control, to provide for proper firing and cooling cycles.

I particularly like the capacity of this kiln to operate safely and efficiently in any temperature range that may be required of it."

There is a Harper Kiln to meet the requirements of every Ceramic Department. Our Kiln Department will be glad to send you full particulars on them.

HARPER ELECTRIC FURNACE CORPORATION
1445 Buffalo Avenue
NIAGARA FALLS, NEW YORK

NEWS NOTES

(Continued from previous page)

at Ball State have also been placed in teacher training institutions with the express understanding that the major portion of their time will be devoted to the development of a program for industrial arts in the elementary grades.

JOHN PLUMMER is located at the Teachers College, Carbondale, Ill., and EARL C. FLOYD at the Iowa State Teachers College, Cedar Falls, Iowa. HENRY A. LOATS, of Ball State Teachers College, is giving half-time to in-service courses for assistance of elementary teachers in handwork for elementary grades. We need to watch the trend in this area very carefully because of the significance of the contribution that is possible to both industrial arts and vocational education.

♦ The American Designers' Institute, at its second meeting of the season, had as its speaker, Philip C. Johnson, director of architecture and design of the Museum of Modern Art. His topic was "Design and Controlled Environment," and was illustrated with slides.

It was a dinner meeting at 7:00 p.m., on October 25, at the Architectural League, 115 East 40th St., New York City.

♦ Dr. Henry L. Hansburg, supervising psychologist of the Bureau of Child Guidance, Brooklyn Section, spoke at the principals night meeting of the Printing Teachers Guild. His topic: "The Print Shop and Spelling and Reading Handicaps in School Children" provided specific answers to long-debated questions. The meeting was held Friday evening, October 21, 1949, at the Brooklyn High School of Automotive Trades, 50 Bedford Avenue, as part of a tribute to the principals of our schools.

New Publications

Visual Aids: Their Construction and Use

By Gilbert G. Weaver and Elroy W. Bollinger. Cloth, 388 pp., 6¼ by 9¼ in., illus. D. Van Nostrand Co. Inc., New York City.

Written by men who know the value of visual aids in teaching from personal experience, this book presents a comprehensive guide to the selection, making, and using of visual aids in an effective manner.

The 19 chapters contained in the book present the subjects under the following headings: Visual Aids and the Sense of Vision; Commercial Materials and their Use in Secondary Schools; Well-Known Visual Aids that Help the Teacher; School Journey — A Visual Aid; Types of Visual Aids in Common Use; Novel Types of Teaching Aids; How to Make, Display, and Use Charts; Projected Teaching Aids; Slide and Motion Picture Films; Making a Projection Setup; The Use of Motion Pictures; Handling, Maintenance, and Storage of Films; Films for Vocational and Technical Schools — Kinds and Use; Administration of Visual Aids Program; Equipment for Visual Aids Center; Teacher Training in the Use of Visual Aids; Needs and Trends in Visual Education; Organization of Community Film Council; and Research in Visual Education.

Welding and Cutting Manual

Cloth, 208 pp., 6 by 9 in., illus., $1.80. Published by The Linde Air Products Company, a Unit of Union Carbide and Carbon Corporation, 30 E. 42nd. St., New York City.

A handbook on the oxyacetylene process which should be useful as a reference and instruction book for anyone who does welding and cutting. It is written in a simple and easy to read style and the instructions are given in step-by-step photographs of actual repair jobs.

Chapter 10 of the book shows over 100 time-

(Continued on page 25A)

BETTER METALS for BETTER HANDICRAFT

Give your metalcraft work a perfect start — by using high quality METAL GOODS handicraft metals. They're easy to work — and assure lasting satisfaction in your handicraft.

- **ALUMINUM and COPPER CIRCLES** . . . For attractive trays, coasters and other useful articles.
- **BRACELET BLANKS and RECTANGULAR SHEETS** . . . of Aluminum, Brass, Copper and Stainless Steel. Ready for your artistic touch.

YOURS FOR THE ASKING . . . "Making Aluminum Trays and Coasters", an interesting and helpful booklet as well as the copper-craft bulletin for beginner or experienced craftsmen. Write for your FREE copy and Metal Goods price list today.

METAL GOODS CORPORATION
Dept. IA
5239 Brown Ave., St. Louis 15, Mo.

NEW PUBLICATIONS

(Continued from page 24A)

and laborsaving things to make, while other chapters give short cuts and instructions for bronze welding; fusion welding; soldering; hard facing; cutting steel and cast iron; heating; forming; and straightening metals; welding and cutting pipe; and welding nonferrous metals.

The appendix contains useful charts and tables, a complete glossary of welding terms, and a list of 100 repair jobs with recommended welding methods.

A Report About Business-Sponsored Teaching Aids

By Thomas J. Sinclair, Ph. D. Paper cover, 113 pp., 7⅜ by 10½ in. F. A. Owen Publishing Co., Dansville, N. Y.

This report presents the nature, purposes, and content of free and inexpensive materials for the classroom; shows how they are prepared, produced, and distributed; mentions their availability, actual use, and evaluation; and gives the author's recommendations.

It is illustrated with many tables and charts.

The Craft of Ceramics

By Geza DeVegh and Alber Mandi. Cloth, 145 pp., 7¾ by 10¼ in., illus., $3.80. D. Van Nostrand Co. Inc., New York City.

This is an interesting beginner's book, which starts with a description of the necessary materials, shows how to wedge the clay, and then shows the student how to make a ceramic flower.

All the processes of handling clay, such as modeling by hand, hand pressing, casting, and the potter's wheel, are thoroughly explained. In each process, various specific projects are given. Necessary tools and materials are listed, and the instructions are plain and easy to follow.

The book also contains a glossary and a list of places where supplies may be bought.

Industrial Arts in General Education

By Gordon O. Wilber. Cloth, 372 pp., 5½ by 8 in., illus., $3.50. International Textbook Co., Scranton, Pa.

A book presenting the modern concept of industrial arts as a part of general education.

It contains 19 chapters in which the purposes of general education are presented; the relationship of industrial arts to general education; the objectives of industrial arts; the selection of subject matter for an industrial-arts course; conducting the class; and giving a demonstration and using visual aids.

There also are chapters on the function and use of projects, written instructional materials, personnel organization, and class records.

Shop planning also is discussed, and the selection of equipment as well as the evaluation of the results of industrial arts.

The five appendices contain useful tests, check lists, and bibliographies on project books and magazines.

Weld Design

By Harry D. Churchill and John B. Austin. Cloth, 216 pp., 5¾ by 8½ in., illus., $5. Prentice-Hall, Inc., New York City.

A machine-design text on welded machine base construction.

It presents information on the principles of welded design, stress analyses, welding specifications, welding procedures and processes, flame cutting and hardening, forming metals, figuring costs, and stress-design data.

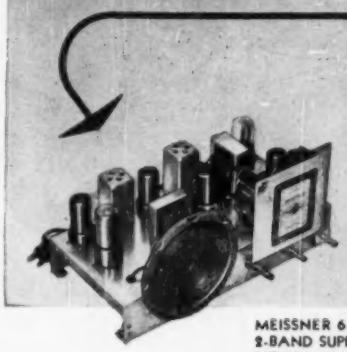
Practical Television Servicing

By J. R. Johnson and J. H. Newitt. Cloth, 344 pp., 6⅛ by 9¼ in., illus., $4. Murray Hill Books, Inc., 232 Madison Ave., New York 16, N. Y.

This book presents the information needed by the television serviceman in a simple, straightforward manner. It was written by men who have done television servicing themselves. They

(Continued on page 26A)

LET YOUR STUDENTS BUILD THIS



QUALITY RECEIVER!

They'll Get Real, Practical Experience... Have the Time of Their Lives...

MEISSNER 6-TUBE 2-BAND SUPERHET KIT No. 10-1199A

Fully illustrated, easy to follow instructions make this set ideal for classroom work! All that is needed to assemble is pliers, screwdriver, and a soldering iron.

Frequencies covered by this broadcast and shortwave receiver are 550 to 1600 kilocycles and 6 to 18 megacycles. Foreign stations, government, commercial and amateur services included on shortwave band.

Highest quality components and careful circuit design assure circuit stability and operating ease. Every component was designed for specific application. Coils for instance, are manufactured especially for this kit by MEISSNER itself, America's leading receiver coil manufacturer. A filter choke provides hum-free output without power loss and an I-F wave trap assures greatest stability of operation.

Large 5-inch speaker for extended audio response without distortion. Tubes used are 12SK7 R-F amplifier, 12SA7 oscillator-mixer, 12SK7 I-F amplifier, 12SQ7 detector, AVC, and audio amplifier, 35L6GT beam power output, and 35Z5GT rectifier. Pilot light for dial illumination. 110 volt, DC or 50-60 cycle AC operation.

Meissner manufactures a complete line of kits. Write for literature.

Only $18.40 NET PRICE

(Less cabinet, tubes, wire and solder)

COMPLETE KIT (Less cabinet) $24.70

NEW... MEISSNER

"HOW TO BUILD" INSTRUCTION MANUAL

160 BIG PAGES... FOR ONLY $1.00

Here's a natural to stimulate student interest! This manual is chock-full of information, detailed description profusely illustrated with charts, radio formulae, schematic circuit diagrams and pictorial wiring diagrams.

It contains a wealth of information on basic theory, design and construction of:

AM Circuits, FM Circuits, TV Circuits, Phono Pickups, Audio Amplifiers, Speakers, Disc Recorders, Many Others

There's also useful coil design and circuit application data for both student and instructor! An ideal manual for professional, beginner or experimenter.

Kits or Manuals can be purchased from your nearest Meissner Dealer.

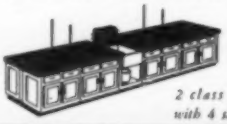
MEISSNER MANUFACTURING DIVISION
MAGUIRE INDUSTRIES, INC.
MT. CARMEL, ILLINOIS

SHELDON

Complete Planning and Complete Implementation is the Secret of Well Equipped Rooms

Good planning—planning which is in step with today's teaching theories—is essential. Equally important, however, is the production of practical and economical physical equipment required to give teaching theories the opportunity to function. In the building and installation of equipment, the ability of the equipment manufacturer to understand and appreciate what is practical, as well as essential, is of prime importance.

Sheldon's long and varied experience in planning, production and installation has time and time again proved its practical and economical value. When you plan with Sheldon and follow-through with Sheldon, you too will appreciate the ease with which teaching requirements may be satisfied.



World's Largest Exclusive Manufacturer of Laboratory and Educational Equipment

2 class Physical Chemistry Table with 4 student positions.

E. H. Sheldon & COMPANY
MUSKEGON, MICHIGAN

NEW PUBLICATIONS

(Continued from page 25A)

have avoided discussing the matter in a purely theoretical manner and have made it as practical as possible.

The book also contains a helpful glossary and a chapter of servicing hints and case histories.

Interspersed throughout the book are questions for discussion. Answers to the odd-numbered questions are given in the appendix.

Compressed Air Handbook: Applications and Equipment

Cloth, 386 pp., 6¼ by 9⅛ in., illus., $3. Compressed Air and Gas Institute, 90 West Street, New York 6, N. Y.

A comprehensive book on compressed-air applications and equipment.

The five chapters in the book describe quite thoroughly how and where compressed air is used, compressed air installations, and its use in portable tools, such as rock drills, tampers, etc.

The planning, selection, and installing of a compressed air plant also is described.

The book also contains a great amount of engineering data.

Saturating Core Devices

By Leonard R. Crow. Cloth, 373 pp., 5¾ by 8¼ in., illus., $4.20. The Scientific Book Publishing Co., 530 South 4th St., Vincennes, Ind.

An excellent book for students of electricity and engineers for designing magnetic devices.

The book consists of a compilation of schemes using magnetic cores and shows how the problem of saturating them magnetically has been solved.

Cumbersome, mathematical proofs have been avoided and graphical methods have been substituted instead.

The book also has a bibliography of books on elementary and advanced electricity, elementary and advanced electronics, communications, and handbooks.

It's Your Business

By J. L. Simon. Cloth, 199 pp., 5¾ by 8¾ in. Fairchild Publications, Inc., New York 3, N. Y.

A helpful book for those who want to start a small business. The author discusses success patterns in small business, presents about 30 sample cases drawn from actual business experience, shows how to choose the business to be followed, shows how business efficiency can be increased, and discusses the causes of business failure and gives suggestions on how to prevent them.

Selling Performance and Contentment in Relation to School Background

By Albert C. Mossin. Cloth, 166 pp., 6⅛ by 9¼ in., $2.75. Bureau of Publications, Teachers College, Columbia University, New York.

A study to determine the effectiveness of present-day distributive occupations courses given in high schools. The findings of this study will have particular interest for vocational educators and for guidance counselors.

Aluminum Alloys and Mill Products

Spiral binding, 5⅞ by 8¾ in., $1. Published by Reynolds Metals Co. Inc., Louisville 1, Ky.

This is a data book containing 163 tables of various kinds, plus 33 pages of explanatory information about a wide range of related material, such as temper designations, heat-treatable and nonheat-treatable alloys, casting alloys, casting methods, and foundry practice.

Fabricating methods, such as blanking, drawing, spinning, embossing, coining, stamping, bending, machining, forming, welding, brazing, soldering, riveting, and surface finishing, also are described.

Who, Me? A Guide for Improving Human Relations

By Arthur O. England. Paper, 24 pp., 4½ by 6⅞ in., illus., 25 cents. Published by National Foremen's Institute, Inc., Deep River, Conn.

A Job for Every Woman

By Louise M. Neuschutz. Cloth, 208 pp., 5¼ by 7¾ in., $3. The H. W. Wilson Co., New York 52, N. Y.

A book of helpful suggestions for the woman who must or wants to work and is not afraid of using her ingenuity and energy.

It is written for the woman who must suddenly support herself and her dependents, but has no training or previous experience.

One who must earn money while staying at home.

A middle-aged woman who can do hard work.

An office worker who is nearing forty and faces unemployment.

A college-trained woman who has to rehabilitate herself.

An elderly woman who is in need of self-support.

The woman who wants to earn extra money.

The woman who can work part time.

The book also describes how to start and run a small business.

Paper Cutting: Machines and Techniques

By George J. Mills. Paper cover, 26 pp., 8¾ by 10¾ in., illus., $1.25. Published by George J. Mills, Pittsburgh, Pa.

An instructive text on the principles involved in the cutting of paper, and the various types of papers that are available.

The book also explains how to handle, jog, count, fold, and cut paper.

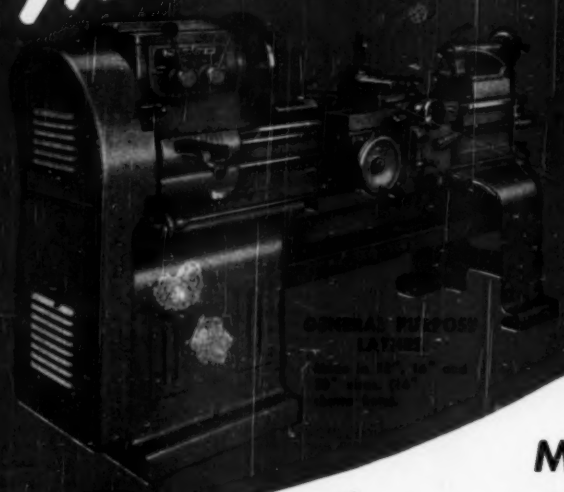
Old and modern cutters are interestingly described and illustrated.

The Ideal Training Lathe

Equipped With
8-SPEED GEARED HEAD

•

Medium-Priced . . . Simple Design . . . Extra-Sturdy Construction



LOW MAINTENANCE COST!

Students trained on the modern "King-made" Sebastian Lathe are *fully* trained — equipped to run any size engine lathe, large or small.

The medium-priced Sebastian, widely used throughout industry, has a great many outstanding construction and operating features. Among standard features are: 8-speed geared head . . . Timken Bearings on all headstock shafts . . . Reverse in apron for feeds . . . 57 feed and thread changes . . . Control handle on apron for longitudinal friction feed . . . Travel safety on compound . . . Apron control for start, stop, and reverse of spindle (standard on lathes with beds 10′ and longer; also available on other bed sizes).

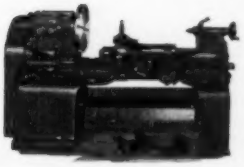
An unusually large number of accessories are supplied as regular equipment, *included in the basic lathe price.*

Before deciding on any lathe it will pay you to thoroughly investigate the modern Sebastian. Ask your nearest Sebastian dealer or write us direct for Catalog S-1 (Standard Lathes) and S-101 (Special Lathes — Gap, Clutch & Brake, etc.)

Sebastian GEARED HEAD LATHES

MANUFACTURED BY KING

BUILDERS OF WORLD-RENOWNED "KING" BORING & TURNING MACHINES



GAP LATHES
Made in 16" and 20" sizes

All Sebastian Lathes are equipped with 8-Speed Geared Heads

American Steel Foundries

KING MACHINE TOOL DIVISION

CINCINNATI 29, OHIO

Builders of Vertical Boring & Turning Machines and Sebastian Lathes

From
MACMILLAN
60 Fifth Avenue
New York 11, N. Y.

New books for vocational courses

MOTOR TUNE-UP MANUAL

By Ralph Jay Everest

A text for auto mechanics courses by the instructor in motor tune up at the Wiggins Trade-Technical Inst., Los Angeles. Full explanation of principles as well as techniques, with especially good instruction on auto electricity. Detailed instruction on all symptoms and causes of trouble and every step in all repair and tune-up jobs. Fully illus. $5.50

RADIO & TELEVISION MATHEMATICS

By Bernhard Fischer

721 problems, with answers, arranged under radio topics, show step-by-step how to set up and solve all radio and electronic problems involving mathematics. Excellent preparation for FCC exams of all classes. A wealth of problem material for teachers of radio and applied math. $6.00

MEET THE PLASTICS

By Clark Robinson

A complete, up-to-date survey of the plastics industry, its products and their many uses, and the vocational opportunities in it. Excellent for vocational guidance. Good background for industrial arts and vocational courses in plastics. $3.75

ELEMENTARY METALLURGY AND METALLOGRAPHY

By Arthur M. Shrager

The first text on metallurgy for high school and vocational courses. Explains fully and in simple terms the science and technology of this very important branch of modern engineering. Provides a related-science course essential for welding, foundry, and all other metal-working training. $4.75

PAINTING WITH LIGHT

By John Alton

One of Hollywood's leading Directors of Photography explains the equipment and techniques of photographic lighting for close-ups, interior and outdoor scenes, and all kinds of special effects. The only source of such information. 295 illustrations. $6.00

AIRCRAFT MECHANIC SERIES

By Col. Rollen H. Drake

Two new volumes in this series of texts for aviation mechanics courses:
Aircraft Electrical Systems, Hydraulic Systems & Instruments, $5.60;
Aircraft Maintenance and Service, $6.00

Previously published: *Aircraft Woodwork*, $3.50; *Aircraft Welding*, $4.00; *Aircraft Sheet Metal*, $5.50; *Aircraft Engines*, $5.90.

Look over these books at our booth at the AVA Meeting at Atlantic City.

THE VISUAL METHOD FOR TEACHING ELECTRICITY AND ELECTRONICS

Complete Set of Components of 100-G Kit

The popular 100-G kit is a complete, self-contained laboratory for the visual demonstration of the principles of electricity and magnetism with their practical application. With the 100-G kit the instructor can visually illustrate almost all of the principles of electricity by means of exciting and dramatic visual demonstrations, always popular with students. A complete package of equipment operated directly from standard 115 AC outlets is within the means of any school budget. On a cost-per-experiment basis it is considerably less expensive than any other equipment.

A correlated text-manual, "Learning Electricity and Electronics Experimentally" by Leonard R. Crow, is furnished with the kit, but the kit can also be used with any standard text on electricity.

Every effort has been made to keep each individual part simple. However, when the parts are assembled in various combinations, almost limitless in number, the resulting experimental effect is vivid and often spectacular.

Write for an examination copy of our new text-manual — "Learning Electricity and Electronics Experimentally" by Leonard R. Crow.

UNIVERSAL SCIENTIFIC CO., INC.
DEPT I, 1102 SHELBY STREET VINCENNES, INDIANA
Send today for free illustrated bulletins and price list

See us at Booth No. 94 A.V.A. Convention — Atlantic City

HAVING A PROBLEM PRESENTING OCCUPATIONS?

use

YOUR LIFE WORK SERIES
Dual Purpose Films

YOUR LIFE WORK films cover 34 vocations and can be used both as orientation material in the *VOCATIONAL* department as well as to present the vocations in your *GUIDANCE* classes.

The locale for each film is in industries covering the vocation. Students see actual workers performing their jobs. Advantages and disadvantages of each vocation are covered.

For Rental — Purchase — Catalog
Write today

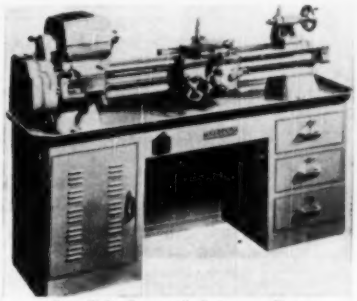
Produced by
VOCATIONAL GUIDANCE FILMS, INC.
International Distribution by
CARL F. MAHNKE PRODUCTIONS
215 East 3rd St., Des Moines, Iowa

Shop Equipment News

NEW PRODUCTS — PUBLICATIONS

NEW SMALL LATHE WITH LARGE COLLET

Sheldon Machine Co. Inc., 4258 N. Knox Ave., Chicago 41, Ill., builders of Sheldon precision lathes, milling machines and shapers, announce a new 10-in. swing lathe with a large 1 ⅜-in. hole through the spindle.



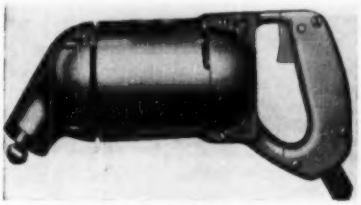
Small lathe with large collet

Other features of this lathe are: large precision roller bearings, a 4-speed (8-spindle speeds) V belt underneath motor drive; full double-walled, worm feed apron; full quick change gears, full enclosed headstock with hinged cast aluminum cover; and standard operator controls and other standard "big lathe" features. Known as the *XL* series, this new lathe will come with 38-in. or 44-in. bed length on a 3-drawer steel bench, or with a pedestal base in bed lengths up to 62 in. in length.

For brief reference use IAVE—1201.

A HEAVY-DUTY VIBRO-CENTRIC DRIVER

The Black & Decker Mfg. Co., Towson 4, Md., has announced the introduction of a new improved heavy-duty 55-deg. Vibro-Centric Driver to their line of valve reconditioning equipment. This new driver, which is much more powerful than any previous model, is being offered at a substantial cost saving.



Black and Decker Vibro-Centric driver

The heavy-duty 55-deg. Vibro-Centric driver is wonderfully suited for reconditioning truck, tractor, and diesel valves where a powerful, high-speed driver is essential. The angle drive of the unit improves working clearance where body, cowl, cab, or other obstructions interfere. The driving spindle incorporates a positive vibrating action, which lifts the grinding stone from the seat once each revolution and prevents stone loading, speeds up grinding, and reduces stone wear.

The spindle speed of the new model has been stepped up to 12,000 r.p.m., and the over-all length has been reduced to 11½ in.

This driver is equipped with grease-sealed ball bearing throughout and all spindles and gears are of special heat-treated alloy steel. Standard voltages are 110 or 220 although the tool is available on special order with 125 or 240 volts. The motor is universal.

Two entirely new Vibro-Centric kits have been announced which incorporate this new driver. The Heavy-Duty Deluxe Universal Kit is carefully planned to provide complete valve seat grinding equipment for shops specializing in large-volume valve work. Included in the kit are a heavy-duty stone dressing stand, ball-bearing stone sleeves, pilot turning wrench, and a large assortment of self-centering pilots and Vibro-Centric stones. A heavy-duty deluxe basic kit is offered with basic equipment which enables the large volume valve shop to assemble stones and pilots to meet their particular requirements. All items in both kits are contained in a sturdy kit box which provides a means of protecting this precision equipment and a place for convenient storage.

For brief reference use IAVE—1202.

NEW GAS DRIVE D.C. WELDER

A new line of low-cost welders has been developed by the Hobart Brothers Company, Troy, Ohio, to be known as the "Bantam Champ" D.C. arc welders.

The one shown is the gasoline engine driven Model ZXB-200-S, designed to meet a certain demand for lower-priced equipment. This model is rated 200 amperes at 25 volts on 50 per cent duty cycle. The current range is from 25 to 230 amperes at an operating speed of 2200

(Continued on page 30A)

AT THE A.V.A. CONVENTION

YATES-AMERICAN ANNOUNCES

Something New . . . Something Different

of Interest To Every School Shop Instructor

DON'T MIT IT!

Yates-American
MACHINE COMPANY—Beloit, Wisconsin

SMOOTHER FASTER CUTTING

BOICE-CRANE 14" BAND SAW

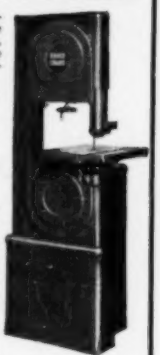
Band saw practically any material accurately. Save sanding labor on every cut. Close balance and light, but strong, moulded Textolite wheels permit twice the speed of other 14" machines with less vibration and long blade life.

High safety rating. Wheels and blade, except at cutting point, are entirely enclosed. Blade guides adjust by a single control with full safety even when operating.

Capacity: Blade to guard, 13⅛", 27" dia. work, clears stock up to 8⅛" thick.

Blade speed at 1200 r.p.m., 4,400 feet per minute. Blade length: 98". Widths: 3/16", ¼", ⅜", ½" and ⅝". Overall height (floor model): 67".

Sturdy one-piece frame. Cabinet type base has sealed-off motor compartment. Table (19" x 15½") tilts on double trunnions. Single and 8-speed back-geared models.



• • •

Boice Crane TRU-FORM* RELIEF SAFETY CUTTERS

First correctly made milled-to-pattern shaper cutters at moderate prices. Real production-type two-wing cutters with the advantages of costlier CIRCULAR or INVOLUTE* relief. This new principle machines the shape into the cutter on an arc that assures clean cutting without burning. Safer than knives. Cut the same true original shape and dimensions, right up to the last sharpening. Larger rake, or cutting angle, shears or shaves, doesn't scrape. Up to 50% more usable life. Adequate initial clearance angle for higher spindle speeds, which never changes when properly sharpened. Result — faster cutting, more production, cleaner cuts. More metal behind cutting edge, reduces chipping, crumbling, under heavy cuts; dissipates heat faster on high speed shaping. Fine, tungsten tool steel. Deep hardened and all tempered. Precision formed. Razor sharp. Authentic, full-sized commercial shapes. Average 3¼" diameter for higher peripheral speed. Designed for the rugged Boice-Crane shaper but improves performance in all other makes. (*Also called flattened-arc relief; cam-profiled relief.)

BOICE-CRANE FRICTION-MATIC WET TOOL GRINDER

Sharpens hand tools without danger of damage to tools or personal injury. Simplified self-adjusting friction roll drive. Peripheral speed remains constant as wheel wears. No water thrown on operator. Permits proper pressure control. Operator takes a comfortable standing position and works on top of the wheel. Large tool rest, the first with adequate adjustment.

BOICE-CRANE INTERMEDIATE CAPACITY POWER TOOLS

- Designed for ready adaptability to a wide range of projects, fewer machines are needed to fill all your requirements.
- As nearly 100% safe as modern devices permit.
- Of just the right size for school shops — not too big, nor too small — they permit more efficient shop layouts.
- Durably constructed, they can take a beating which would incapacitate most machines.

BOICE-CRANE COMPANY
932 Central Avenue • Toledo 6, Ohio

Please send free literature on Boice-Crane's
☐ Band Saw ☐ Wet Tool Grinder ☐ New 44-page catalog No. 50 on entire line
☐ Bulletin on Tru-Form Relief Cutters for Shapers

Name .....
School .....
Street .....
City & State .....

SHOP EQUIPMENT NEWS

(Continued from page 29A)

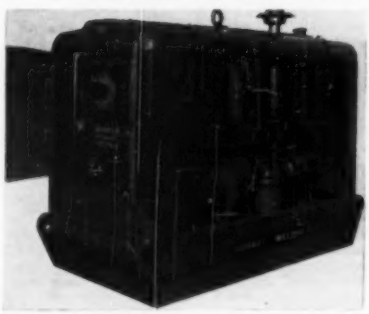
r.p.m. It is 55 in. long, 22 in. wide, 38½ in. high (incl. exhaust), and weighs approximately 770 pounds.

The generator is a modified multirange type with four laminated main poles and four interpoles which are removable. Four heavy-duty generator brushes are held in a fixed neutral position by patented single unit brush rigging.

Its welding controls are modified multirange dual control, with 5 ranges of welding current and 100 steps of volt-ampere adjustment in each range, making available 500 combinations of open circuit voltage and welding current for selecting any desired arc characteristics. Main switch is heavy copper, molded in bakelite, controlled by the large, hard-rubber covered hand wheel. Volt-ampere adjuster is compactly built behind the main switch.

The generator is driven by an Hercules ZXB, 4-cylinder industrial engine. It is water cooled and is complete with oil-bath type oil filter, gasoline filter, and muffler.

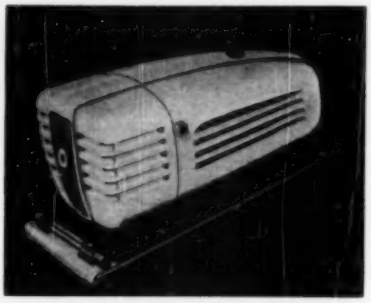
For brief reference use IAVE—1203.



Hobart Bantam gas drive d.c. welder

STERLING INTRODUCES NEWEST PORTABLE ELECTRIC SANDER

The Century, a completely new portable electric sander, weighing only 4¾ lb., and featuring a nonstalling, high-speed motor, has just been introduced by Sterling Tool Products Company, 1340 N. Milwaukee Ave., Chicago 22, Ill.



The new Sterling Century portable electric sander

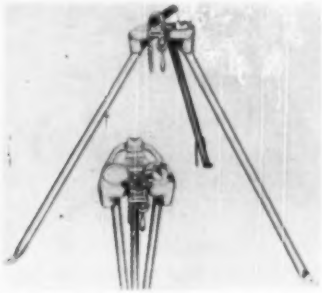
This compact, easy-to-handle sander operates on the *orbital motion* sanding action principle which has proved so effective in producing fine, uniform sanding results while enabling the operator to control the amount of surface material to be removed. This type of action permits sanding of parallel boards with opposing grain structures without risk of grit scars.

The sanding speed of this sander is from 3 to 10 times faster than that of hand methods. As a further economy feature, standard-size abrasive sheets cut in thirds are used and as many as four or five sheets can be loaded on the pad at one time.

For brief reference use IAVE—1204.

NEW WILLIAMS TOOLS

A new aluminum vise stand, which combines light weight with rigidity and strength found in heavier iron or steel types, has just been perfected by J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N. Y.



Williams combination pipe vise, stand, and pipe bender

The base is made from special aluminum alloy which has high tensile and high impact properties. Its heavily reinforced design prevents distortion under severe service. Two pipe benders are provided, one for pipe up to ½ in., and the other

(Continued on page 32A)

Here's an Answer to Questions on

TECHNICAL TRAINING

THIS non-profit school offers important advantages to the young man with technical interests. Here he can secure both practical, specialized training in a field of his choice — plus a solid educational background in the basic sciences and humanities. Because of continuous year-round study, a Bachelor of Science degree can be earned in 36 months.

If unexpected events force the student to leave school before he secures his degree, he retains the benefits of certificates which he gained upon reaching Service or Technician levels.

COURSES

SERVICE . . . 6 to 12 Months
- Practical Electricity
- Practical Welding
- Refrigeration Service
- Heating Service

TECHNICIAN . . . 12 to 24 Months
- Radio & Television Technician
- Electro Technician
- Electronic Technician
- Refrigeration, Heating & Air Conditioning Technician

PROFESSIONAL . . . 36 Months
- Electrical Engineering ... Bachelor of Science Degree—Major in Electrical Power or Electronics

AN INVITATION TO YOU

Write or visit our booth at the A.V.A. convention for guidance literature and scholarship data which will be helpful in specific counseling problems.

MILWAUKEE SCHOOL of ENGINEERING

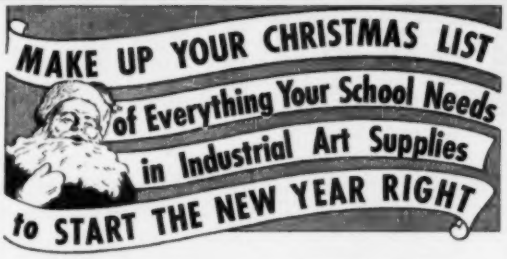
Founded 1903 by Oscar Werwath

Dept. IA, 1020 N. Broadway, Milwaukee, Wis.

Solves many other woodworking problems in seconds . . . simply set dial to get measurements; slope per foot in degrees; comparative hardness, weights and workability of various woods; bit sizes; nail specifications; tool sharpening tips. 6" diameter heavy varnished cardboard. Special offer. Send 10c to Greenlee Tool Co., 2352 Twelfth Street, Rockford, Illinois.

Remember—GREENLEE is the name for dependable, high-quality tools.

GREENLEE



CABINET HARDWARE
- ☐ Chest Hinges
- ☐ Period Furniture Trim
- ☐ Cushion Glides
- ☐ Chest Locks

ELECTRICAL SUPPLIES
- ☐ Testing Meters
- ☐ Lamp Sockets
- ☐ Toggle Switches
- ☐ Lamp Cord

PLASTICS & FINDINGS
- ☐ Plexiglas Sheets
- ☐ Lucite Tubes
- ☐ Bar Pins
- ☐ Plastic Dyes

SHEET METAL SUPPLIES & EQUIPMENT
- ☐ Bar Folder
- ☐ Squaring Shear
- ☐ Rotary Machines

WOOD & METAL WORKING BENCHES
- ☐ L-4 Locker Benches
- ☐ Wall Benches
- ☐ Sheet Metal Benches

SOFT TEXTURE LUMBER
- ☐ Poplar, Basswood, and Cedar

POWER TOOLS
- ☐ Tilting Arbor Saw
- ☐ Jig Saw
- ☐ Jointer

MECHANICAL DRAWING EQUIPMENT
- ☐ Drawing Sets
- ☐ T-Squares
- ☐ Drawing Boards

FOUNDRY EQUIPMENT
- ☐ Flasks
- ☐ Spoons and Slicks

METAL STORAGE CABINETS
- ☐ Double Door Storage Cabinet
- ☐ Utility Tool Cabinet
- ☐ Welding Bench

HANDICRAFT
- ☐ Leather Supplies
- ☐ Pottery Kilns
- ☐ Lapidary Machines

CHECK and tear out this ad as a reminder of of some of the needed equipment, machines and supplies you'll be wanting for starting off the New Year right. Use it in referring to your Brodhead-Garrett catalog, where you will undoubtedly find many other items you need. Make up your order now and send it on for prompt delivery.

BRODHEAD GARRETT CO.

"Everything in Industrial Art Supplies"

4560 E. 71st ST. CLEVELAND 5, OHIO

PAXTON LUMBER

"The Trade Mark of Quality"

In purchasing Paxton products you can depend upon receiving materials of constant quality — in grade, texture and kiln-drying.

Paxton lumber and plywood are uniformly of first quality to meet every requirement. Quality is an important consideration in modern school shops since materials of doubtful quality never prove to be economical or satisfactory.

Paxton products provide a source of supply for many kinds of materials of highest quality obtainable, measured and graded in the best interpretation of current national grading rules, including the following:

Apitong	Cherry	Holly	Plywood - Pine
Ash	Chestnut	Magnolia	Plywood - Hardwood
Balsa	Cottonwood	Mahogany - American	Poplar
Basswood	Cypress	Mahogany - Philippine	Prima Vera
Beech	Ebony	Maple - Hard	Redwood
Birch	Elm	Maple - Soft	Rosewood
Buttermut	Fir Lumber	Oaks	Sycamore
Bird's-eye Maple	Gum	Pines	Teak
Cedar - Aromatic Red	Hickory	Plywood - Fir	Walnut Willow

We also offer a source of supply for:

Ball Bat Blanks	Chest Sets	Glues	Walnut - Cedar Chest Sets
Bed Panels	Closet and Chest Lining	Rez	
Bed Slats	Dowels	Sample Sets	
Boat Panels	Formica	Surfaced Thicknesses	
Bow Staves	Furniture Squares	Table Legs	

Our reputation guarantees you the finest in these materials.

WRITE FOR INDUSTRIAL ARTS CATALOG CONTAINING DESCRIPTION OF VARIOUS KINDS OF WOOD AND PRICE LIST.

FRANK PAXTON LUMBER CO.

Specialists in Industrial Arts Lumber and Plywood

WRITE TO YARD NEAREST YOU FOR FREE CATALOG

Offices and Yards at:

Chicago, Illinois — 5701 W. 66th Street
Denver, Colorado — P.O. Box 1676
Des Moines, Iowa — P.O. Box 683
Fort Worth, Texas — P.O. Box 1225
Kansas City, Kansas — Packers Station

SHOP EQUIPMENT NEWS

(Continued from page 30A)

for pipe up to ¾ in. Recess for oil can and handy slots for tools are provided in addition to the *V* pipe support. This new stand includes the time-tested Williams No. 1 "Vulcan" pipe vise which has a capacity of ⅛ to 2 in.

This firm also markets a new diagonal cutting

Williams diagonal cutting pliers

pliers in 6- and 7-in. sizes. Special high carbon steel is used in drop-forging these pliers. In addition to hardening and tempering, the jaws receive a second hardening by electronically controlled heat treatment.

Cutting edges are precision machined and hand sharpened to an edge which offers the maximum in cutting ability consistent with long wearing, non-nicking characteristics. Unusually large diameter rivets assure smooth action without distortion over a long period of use even when cutting the heaviest wire.

The pliers are finished with a patented luster-black protective finish for longer lasting good appearance.

For brief reference use IAVE—1205.

COLUMBIAN HYDRAULIC VISE

The Columbian Vise and Mfg. Co., 9017 Bessemer Ave., Cleveland 4, Ohio, announces a

Columbian hydraulic vise

new oil-hydraulic vise. It is a swivel-type, foot-operated, machinist's vise with 3½-in. jaw width and 6-in. jaw opening.

Being a foot-operated vise, both hands are always free for handling and positioning work between the jaws of the vise.

This vise also is equipped with an adjustable production stop which can be set at any point within the full range of jaw opening to hold a series of pieces of the same size and shape. The production stop is adjusted with the first work piece held between the jaws of the vise and then backed off to give just enough clearance for working. This enables work to be done at a saving of 25 per cent on some types of bench production work.

For brief reference use IAVE—1206.

NEW STENCIL SHEETS, LETTERING GUIDES, AND DRAWING INSTRUMENTS

A. B. Dick Company, 720 West Jackson Blvd., Chicago 6, Ill., are marketing a complete new line of stencil sheets. The sizes of these sheets range from 4 by 8½ in. to 12½ by 22 in.

Of the ten types of stencil sheets, all available in a number of sizes, three are blue, five are yellow, and two are the new eye-ease green color. Both the blue and yellow in legal and letter sizes may be obtained with the new satin finish, low glare film cover. A special white, coated cushion is provided for use with the blue stencils and a black, tissue cushion is provided for the yellow and the new eye-ease green. Both types of cushion provide a high degree of visibility for typing and proofreading and reduce typing fatigue.

The blue stencil sheets, including the low cost economy blue sheet, may be used for reproduction of typing, handwriting, illustrations, lettering, freehand drawing, and office forms. The yellow stencil sheets are designed primarily for typing and handwriting and both the stubless yellow and stubless green sheets are especially recommended for production of systems and procedures copies. The new green stencil sheet may be used for limited illustration and forms work, as well as for typed copies.

Four special stencil sheets for production of 4-page folders, 2-column and 3-column mimeographed bulletins and newspapers, handwriting and addressing labels, also are available.

(Continued on page 34A)

The Artist

Paul Suess, especially known for his unique pen and ink style.

The Illustration

One of a still life group drawn from nature for a privately printed book.

The Medium

Higgins American India Ink, of course. Suess's approach to black and white illustration is that of a painter. He literally paints with line and stipple which gives his work its remarkable illusion of color.

For increased control that leads to mastery, use Higgins Drawing Inks in your own work.

HIGGINS INK CO., INC
271 NINTH ST., B'KLYN 15, N. Y.

SINCE 1880
THE BASIC ART MEDIUM

PAINT CRAFT PROJECTS WITH RAYON!

Revolutionary Method of "Suede-Tex" Flock Finishing in Any Color Desired Opens New Beauties to Craft and Shop Projects. Decorate, Cover Repairs, Apply Scratchless Bases to Wood, Metal, Plastic, Glass, Plaster, Paper, Cardboard, etc.

WHAT IS "SUEDE-TEX"?

Simply this — it consists of fine fibre strands, cut to closely controlled uniform lengths of 1/32 of an inch. The pleasant touch and eye-appeal of "Suede-Tex" is made possible because these fine cut fibres are specially prepared from rayon filaments dyed to a deep richness of color to produce a greater depth of pile.

HOW IS "SUEDE-TEX" APPLIED?

You simply brush the special undercoat adhesive on the object, and this coat of adhesive becomes the base in which each little rayon fibre imbeds itself and stays put as ejected from the high velocity spray gun.

IT SOUNDS SIMPLE AND IT IS SIMPLE — but the effect obtained will astound you.

THE "SUEDE-TEX" KIT as shown contains enough material to cover 30 sq. ft. Beautiful Colors Available in Small Quantities or Bulk.

COMPLETE KIT LISTS

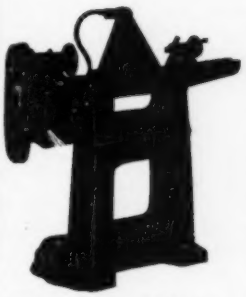
$7.95

Your Discounts Are 40% From List Prices.

WRITE FOR FREE LITERATURE AND SAMPLE

DonJer Products Co. 1115 Sterling Place, Brooklyn 13V, N. Y.

Specify * WALLACE
on your new school-shop equipment



*WALLACE NO. 46 LATHE

For Greater Range, . . . Better Work.

WALLACE NO. 46 MULTI-SPEED LATHE

Nine speeds, quickly changed, from 550 to 2400 r.p.m.! Exclusive swivelling headstock provides unlimited capacity for face-plate or center-turning work. Automatic-tensioning device provides proper belt tension — eliminates belt and bearing loads when machine is idle.

Quality-built — designed for extra performance, longer life.

PROMOTES LONG-TIME ECOMONY

Write today for free bulletins and prices on your machine needs.

RADIAL ARM & UNIVERSAL SAWSJOINTERS***BANDSAWS***MORTISERS***
SHAPERSLATHES***BORERS***SANDERS***GRINDERS***

J. D. WALLACE & COMPANY
140 So. California Ave. • • • Chicago 12, Ill.
PIONEER MANUFACTURERS OF PORTABLE WOODWORKING MACHINES

YOU'LL SEE OLD FRIENDS
with a lot of
NEW BOOKS
at BOOTH 30
AVA CONVENTION

(1) VOC. SPEECH
HOW TO TALK MORE EFFECTIVELY
by
Jean Bordeaux
Realistic training for interviews, conferences, telephone conversations, and the type of public speaking that your students must engage in after they enter industry or business. Price $2.75.

(2) APPRENTICES
TEACHING APPRENTICES
and
Preparing Training Materials
by
Miles Anderson
A comprehensive discussion of the organization, administration, and teaching problems of an apprentice program. Full of carefully tested suggestions that have improved instruction techniques and have contributed to the success of many apprenticeship programs. Price $3.00.

(3) VOC. MATH.
MATHEMATICS FOR INDUSTRY
by
S. E. Rusinoff
The mathematics that industrial experience has proved that you need in the engineering shop, drafting room, tool room, and for precision inspection. Price $5.50.

(4) FOR EVERYONE
APPLIED DRAWING AND SKETCHING
by
Fleming-Barich-Smith
A course that checks a student's aptitude for drafting while providing him with the basic information and exercise of skill that everyone needs both at home and at work. Price $2.00.

Please send me the following books on 30 days' examination. (Circle the numbers below that correspond to the books you want.)
(1) (2) (3) (4)
Name
School
Address
City
Zone State

AMERICAN TECHNICAL SOCIETY
Drexel Ave. at 58th Street
Chicago 37, Illinois
Dept. W371

Publishers since 1898

SHOP EQUIPMENT NEWS

(Continued from page 32A)

This firm also markets a complete new line of mimeograph drawing instruments, and lettering guides, manufactured by the molded plastic process.

The lettering guides are much thicker than other guides, and therefore, do not slip under the T square or slide on the surface of the stencil sheet while in use. The character openings in the

Lettering guides and drawing instruments for cutting stencils

guides are now tapered so that the openings at the top are wide enough for easy and quick insertion of the stylus point and narrow at the bottom to provide more accurate control of the stylus point.

The new screen plates, which are used for shading, also of molded plastic, are transparent and are 3 by 6 in. in size. The new large size eliminates the need for moving the plate when large areas are to be shaded.

For brief reference use IAVE—1207.

MANUAL FOR WOODWORKERS

Albert Constantine and Son, Inc., 797 East 135th St., New York 54, N. Y., publish Constantine's Master Manual for Woodworkers, the 1949 issue of which is now ready for distribution.

This 112-page booklet is full of interesting information and catalog material on veneers, lumber, hand and power tools, blueprints, books, finishing materials, hard-to-get materials, plastics, and boatbuilding plans, materials, and supplies.

This firm, which took over the Thurston Supply Company in 1946, has added to its main business of furnishing fine woods to manufacturers, builders, schools, and home craftsmen, the task of furnishing the hard-to-get material previously stocked by Thurston.

Albert Constantine and Son, Inc., also publishes a house organ, "Chips and Chats," four or five times a year which the firm will send with the manual to readers of this magazine for 25 cents.

For brief reference use IAVE—1208.

CERAMIC CATALOG

Amaco's new ceramic catalog is off the press and available on request. There is a small electric kiln of new design and size, and a marvelous new variable speed potter's wheel that incorporates all the latest devices with streamlined design. There are other Amaco electric kilns and potters' wheels to meet the varied needs of the professional potter, hobbyist, school, and studio.

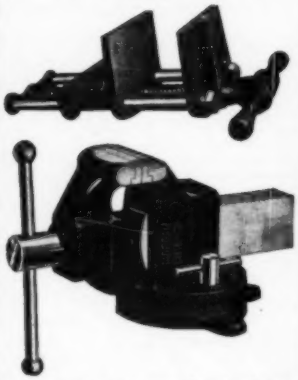
The selection of the many clays, glazes, and supplies listed in this catalog is based on 25 years of experience in the ceramic field.

For a copy of Amaco Pottery Supply and Equipment Catalog No. 39 write — Ceramic Department, American Art Clay Company, 4717 W. 16th St., Indianapolis 24, Ind.

For brief reference use IAVE—1209.

(Continued on page 36A)

SEALACELL PROCESS
PENETRATING WOOD FINISHES
Sealacell
Varnowax
Royal Finish
for
Furniture — Cabinets
Millwork
NO BRUSHES REQUIRED
NO RUBBING BETWEEN COATS
Send For Folder "Facts" With Special Wood Blending Work Sheet. A Post Card Will Bring It.
GENERAL FINISHES SALES AND SERVICE CO.
1548 West Bruce Street Milwaukee 4, Wis.

MORGAN VISES

Morgan vises can be had in various sizes and styles to meet every purpose. Write for literature and prices.
MORGAN VISE CO.
120 N. Jefferson Street
Chicago, Illinois

Classroom ART TABLES

Let us know *your* Requirements

INVESTIGATE OUR LOW SCHOOL PRICES

DRAFTING EQUIPMENT OUR SPECIALTY!

ENGINEERING MANUFACTURING CO.
623 NO. COMMERCE ST. SHEBOYGAN, WIS.

SECO

There is no substitute for Quality

• For best classroom results, make sure the Drafting Supplies and Artist Materials you use bear the well-known WEBER Trade-mark . . . . .

WEBER
Trade Mark Reg. U. S. Pat. Off.

Artist and Drawing Materials

CAT. VOL. 700 TO TEACHERS AND SCHOOLS ON REQUEST

MECHANICAL DRAWING SUPPLIES		ART AND COMMERCIAL ART MATERIALS	
Drawing Instruments	Curves	Tempera	Brushes
T-Squares	Scales	Show Card Colors	Linol Block Printing Inks and Materials
Triangles	Slide Rules	Malfa Oil and Water Colors	
Drawing Boards	Protractors	Waterproof Drawing Inks	School and Drafting Room Furniture
Drawing Tables			

Patronize Your Nearest Weber Dealer

F. WEBER CO.
PHILADELPHIA 23, PA.
St. Louis 1, Mo. Baltimore 1, Md.

A PROFESSIONAL SERVICE

We have long had the feeling that shop teachers in the great field of industrial arts and vocational education are genuinely interested in improving their techniques and practices. This feeling, coupled with direct inquiries for professional assistance in many areas of shop work, has caused us to actually seek out manuscripts which can be of real assistance to meet these needs.

Following the great impetus World War II gave audio-visual aids in education, the school shop instructor wanted to know how he could effectively utilize this technique in his shop program. The publication of TEACHING WITH FILMS by George H. Fern and Eldon B. Robbins, two well known leaders in vocational education and visual aids, was the answer. Then, in order to give assistance to those teachers interested in creating better designs for their projects we selected a number of outstanding manuscripts of which the latest is CONSTRUCTIVE DESIGN by Burl N. Osburn. Also, after examining many manuscripts which could provide the right kind of information teachers desired on operating better school shops, how to present technical subjects and industrial skills with greater competency, and make better application of good teaching techniques, we finally found the answers in SCHOOL SHOP ADMINISTRATION by Arthur B. Mays and Carl H. Casberg; TRADE AND JOB ANALYSIS by Verne C. Fryklund; 250 TEACHING TECHNIQUES by Edward C. Estabrooke and R. Randolph Karch; and HOW TO READ STATISTICS by R. L. C. Butsch.

We are proud of the contributions these titles are making to the growth and development of our more effective educational practices and techniques and salute the teacher, who through them, is making such splendid personal improvement and professional advancement.

THE BRUCE PUBLISHING COMPANY
712 MONTGOMERY BUILDING • MILWAUKEE 1, WISCONSIN

STERLING STEEL FLASKS

Assure Easy Handling

Sterling all-steel, all-welded foundry flasks combine maximum strength with minimum weight. Solid center rib and solid sand flanges at top and bottom. Full-width bearing. In style "S" flask, pin lugs and handles are combined. When closing flask, molder can guide cope over pins by feeling pins with his fingers. In many foundries, style "S" flask has replaced snap flasks. Prevents run-outs. Requires less sand.

Write for new Catalog No. 59, describing the complete line of Sterling Foundry Equipment.

SHOP EQUIPMENT NEWS

(Continued from page 34A)

CALIFORNIA SCHOOL OF SCREEN PROCESS

A concise, complete kit has been designed to teach the art of silk screen process printing. This kit contains 35 information lessons — over 300 pages covering every phase of the silk screen process — in the fields of textile printing, making signs, monograms, and photographic stencils, in easy step-by-step instruction.

Kitway professional method

Besides the lessons there are 14 colorful work projects designed to put what is learned to actual practice. The student will thus produce greeting cards, art work, textile prints, decalcomanias, toy designs, as part of his or her training. Also furnished are over 40 screen process materials, including such items as stencil silk, squeegee, oil and lacquer paints, stencil papers, etc., to enable the student to complete the 14 work projects.

Upon completion, the student will be equipped to practice the fascinating art of silk screen process printing for profit, or as a hobby. This Kitway Method also may be put to good use by the artist, hobbyist, printer, display man, textile designer, and sign painter.

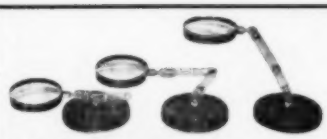
For further information write to the California School of Screen Process, 3740 Overland Ave., Los Angeles 34, Calif.

For brief reference use IAVE—1210.

NEW PLYWOOD STANDARD

A reprint of the voluntary standard of the Douglas Fir Plywood Association adopted November 1, 1948, and known as the Commercial Standard CS 45-48 for Douglas Fir Plywood, may be obtained by writing to the Douglas Fir Plywood Association, Tacoma 2, Wash.

For brief reference use IAVE—1211.



MASTERCRAFT

ALL PURPOSE MAGNIFIER

This magnifier is one of the most useful instruments to have around the home, work shop and office. It has ample power for reading the finest print, for inspecting small parts and mechanisms, for inspecting textiles, stamps, coins and insects. The optically ground and polished lens is mounted in a brass, black lacquered, frame. The linkage is heavy. Fittings are nickel plated. The cast iron crinkle finished base is heavy to prevent tipping.

Made in Two Sizes:

No. 502 — 2" Lens $6.50

No. 503 — 3" Lens $6.95

All items are mailed postpaid if check or M. O. accompanies order.

DEALER INQUIRIES INVITED.

Mastercraft Manufacturing Co.

P.O. Box 256 Hawthorne 4, N. J.

METAL CRAFTS

Tools, Materials and Supplies

- **Hammers, anvils, enamels, etching materials, books and findings.**

Send 50¢ for our new catalog IA. Payment credited on first $3.00 order.

METAL CRAFTS SUPPLY COMPANY

10 Thomas Street Providence, Rhode Island

CASTINGS

To make fine HOME WORKSHOP MACHINES. Especially designed for ease in machining in the school shop and as projects for top interest and instruction. WRITE NOW for literature on our DEPENDABLE CASTINGS and blue prints.

DESIGNERS COMPANY

724 Monroe Ave. Racine, Wis.

LUMBER FOR SCHOOLS

T. A. FOLEY LUMBER CO.

PARIS, ILL.

BALSA

MILL END BLOCKS

Priced below actual factory cost

★

WRITE FOR PRICES AND FULL DETAILS

TESTOR CHEMICAL COMPANY

(WOODWORKING DIV.) ROCKFORD, ILLINOIS

NOW TEACH SCREEN PROCESS

CREATE NEW INTEREST IN YOUR CLASSROOMS

. . . . and new interest for yourself

SCREEN PROCESS is now enthusiastically accepted as a new medium of expression in the Graphic Arts field. It is being used extensively by the COMMERCIAL ARTIST, the FINE ARTIST, PRINTERS & LITHOGRAPHERS, the SIGN & SHOW CARD WRITER and other members of related fields and crafts. KITWAY offers detailed instruction and practical experience through actual Work Projects on the KNIFE-CUT STENCIL, PHOTO STENCIL, DECAL PRINTING, SERIGRAPHY, TEXTILE PRINTING and all other phases of Screen Process. KEEP YOUR COURSE ABREAST OF THE LATEST DEVELOPMENTS IN THIS IMPORTANT FIELD.

FILL OUT THE HANDY COUPON FOR FREE LITERATURE AND MAIL TODAY.

Kitway Method of Silk Screen Instruction
3740 Overland Ave Los Angeles 34, Calif.
V129
NAME
ADDRESS
CITY STATE

MAIL COUPON NOW!

• KITWAY METHOD OF SCREEN PROCESS INSTRUCTION •

3740 Overland Ave., Los Angeles 34, Cal., Dept. V129

Plastics and Supplies

Schools in every state of the Nation use us as their principal source of supply.

We are a leader in the Plastics field.

Write for *free* list of plastics, materials, and supplies. Our prices are lower.

PLASTIC SUPPLY COMPANY

2901 N. Grand Blvd. St. Louis 7, Mo.

EDUCATIONAL
LAMP PROJECTS

Of particular interest to instructors — in woodworking, general shop, plastics, crafts, electricity, and many other shop courses. Students can design and make the body of the lamp. We supply all other parts necessary — sockets, cords, plugs, shades, harps, switches, etc. Over 700 different parts shown in wholesale catalog. A MUST for all instructors interested in keeping students occupied with highly **educational** and **useful** projects. Send today for wholesale price list and parts catalog.

THE GEARON COMPANY
Dept. 100-K12 • 27 S. Desplaines St. • Chicago 6, Ill.

GENERAL PRINTING

BY CLEETON & PITKIN. A book of unusual value for beginners. Rated a superior text by those who have used it. Many illustrations. Important facts about paper, ink, type metals are included, as well as instructions for setting type, inking, proofing, proof-reading and many other valuable guides. Also included: Methods of printing, tieing up, pulling proofs, washup, distribution, micrometer gauge, mitering machine, borders, lock-up, platen press, makeready, type families, identification, occupations, alphabets, history, early printing, stereotypes, electrotypes, plates, plate-making and many other important topics. $1.60. Send for approval copy. Clip this.

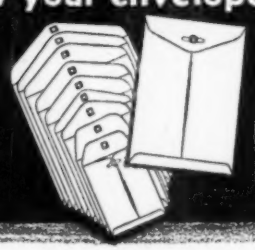
GENERAL BOOKBINDING
By Chris H. Groneman. Elementary instruction in hand bookbinding, presented through construction of attractive projects. $1.00

GENERAL PLASTICS
By Raymond Cherry. This book tells how to work plastics with hand tools, power tools and how to do internal carving and dyeing. Designs and directions for 49 projects. Revised 1948. $1.50

and

McKNIGHT & McKNIGHT PUBLISHING COMPANY
Dept. 19, Market and Center Sts., Bloomington, Ill.

Know your envelopes . . .



Clasp Envelopes

"A convenient means to inexpensive packaging."

When you want extra safety and additional protection for your large or bulky materials to be mailed, then you should use a Clasp Envelope. These envelopes are built of rugged, heavy stock, equipped with a burrless metal clasp, and come in a wide variety of sizes. They are used in many cases to carry heavy magazines, machine parts, steel wool, shavings, instruction manuals, photographs, cloth or fabric samples, and similar large items that require complete protection but do not call for the expense of a box container. The clasp feature permits you to insert and extract the contents several times. The clasp also allows you to send material through the mail at third class rates yet guarantees you of a protective seal.

Western stocks 22 sizes ranging from 2½"x 4¼" to 12"x 15½".

WESTERN STATES *Envelope Company*
1616 WEST PIERCE ST. MILWAUKEE 4, WISCONSIN

MAKE PLASTIC PARTS

Your Source of Supplies for all Plastic Craft Projects

- METALLIC COATED CELLULOSE ACETATE
- SCREW DRIVER HANDLE STOCK

- PLEXIGLAS — LUCITE — CELLULOSE ACETATE, in sheets, rods, tubes, clear and colored, full range of sizes
- CASTOLITE
- ADHESIVES
- METAL FINDINGS
- PLASTIC JEWELS
- POWER TOOLS
- HANDBOOKS
- DYES
- BUFFS
- FINISHING COMPOUNDS
- Injection — Compression Lamination Presses

— and Many More Items — Over 2000 in All!

SEND FOR PRICE LIST AND CATALOG!

INSTRUCTORS: Send for our free 14-page price list, Jewelry Findings Catalog, and Information on Fabrication of Plastics — your buying guides for all plastic craft needs. Write on school letterhead. STUDENTS must send 25¢ for this literature which amount will be deducted from first order.

Prompt Shipment Anywhere in U. S. A.

PLASTIC PARTS & SALES Dept. S-2129
1157 S. Kingshighway Blvd. St. Louis 10, Mo.

UPHOLSTERING

SUPPLIES

•

TOOLS

FOAM RUBBER
K-D CHAIR FRAMES
CHAIR ASSEMBLY KITS

Everything in supplies and tools for upholstering and furniture making. Send for Price List and descriptive literature.

THE TYCON COMPANY
Dept. 12V CHALFONT, PA.

SWISS MUSIC MOVEMENTS AVAILABLE

Industrial Arts teachers—here's a new project for your shop classes. Adapting swiss musical movements profitably and easily to toys, quality gifts, and novelties. Units priced as low as 80 cents. One and two tunes in stock. Write for free photo and details. Act now in time for your Christmas project. Address inquiries:

LEONARD PEVAR
2218 Lynhaven Avenue Richmond, Va.

LEATHER & CRAFT SUPPLIES

NEW . . . Illustrated 84 page catalog.. Thousands of items for the Leathercraft teacher and student..Leather supplies.. Tools . . Books . . Patterns . . Designs . . Art projects • Send 10¢ today to cover handling charges.

RUSSO HANDICRAFT SUPPLIES
Dept. 1A-9, 245 South Spring St., Los Angeles 14, Calif.

Paint Brush Conditioner

PROTEXEM

for SCHOOL SHOPS

PROTEXEM'S vapor action will keep your paint brushes soft, pliable and always ready for use. Hard-as-rock brushes reclaimed perfectly. Brushes hang in vapor, not liquid. Holds 4 to 6 brushes. Guaranteed.

Container and years supply of vapor solvent for average need..... $2.75

SEND ORDER NOW TO

WISCONSIN LABORATORIES, Inc.
2138 N. Third St. Milwaukee 12, Wis.

WANT GOOD SERVICE?

When in a rush, send your order to us 27 years of good materials.

OUR NEW CATALOGUE NOW READY

INDIANHEAD ARCHERY MFG. CO
BOX 303-BP LIMA, OHIO

Extra prompt service

Heat Treating Furnaces and Equipment

FORGES—gas fired, no smoke or dirt. Sizes from the bench type at right to large floor models.

MELTERS—for aluminum, brass, lead, gold, etc., many sizes and types.

We also supply Ovens, Salt Baths, Complete Shop Tables — Blowpipes, Burners Etc.

American Gas Furnace Co.
Elizabeth, N. J.

Bookbinding Equipment and Supplies
Rubber Stamp Equipment and Supplies

Catalog on request

G. A. PRATT COMPANY
1108 West Chicago Ave. • East Chicago, Indiana

FREE

INSTRUCTION BOOK on METAL SPINNING

sent to anyone on request.

BOICE-CRANE COMPANY
932 Central Avenue • Toledo 6, Ohio

Headquarters for spinning tools and accessories for most makes of lathes.

★ CRAFT PROJECTS
INSTRUCTION BOOKS
PATTERNS
LACINGS
TOOLING LEATHERS
Put-Together projects for Young and Old

If you have not received our #16, 68 Page Catalogue, which has in it hundreds of Craft items of interest to your Crafts Department, we will be glad to send one to you. *The catalogue will tell you the rest of the story.*

OSBORN BROS.
223 W. Jackson Blvd.

House of Leathercraft for 31 years.
Chicago 6, Ill.

KNOCKDOWN CEDAR CHEST

Write for Free Price List Today

GILES & KENDALL CO., Huntsville, Ala.

AMACO

OVER 25 YEARS OF SERVICE TO SCHOOLS AND HOBBYISTS

POTTERY SUPPLIES AND EQUIPMENT

KILNS • CLAYS • GLAZES • WHEELS

Write for Pottery Catalog

AMERICAN ART CLAY CO., Indianapolis, Ind.

Electro-Typers

Especially qualified to be of service to the school printshop.

Promptness and quality assured.

Forms returned same day received.

Badger - American Electrotype Co.
600 Montgomery Bldg.
407 East Michigan St., Milwaukee, Wis.

High Grade
Printing Inks

For SCHOOL PRINT SHOPS

COVERWELL INKS FOR QUALITY PRINTING

MARTIN DRISCOLL & CO.
610 Federal St. Chicago, Ill. | Portland, Oregon | 407 E. Michigan St. Milwaukee, Wis.

PRACTICAL HELP FOR CRAFT TEACHERS

Send coupon below today for 80-page American Handicrafts Catalog of tools and materials!

Like to make craft-teaching easier, learning more fun? Then do as teachers everywhere are doing! Send to American Handicrafts, *today* for complete 80 page catalog of classroom-tested tools and materials. America's largest source of quality leather, metal, wood for schools!

LISTS OVER 500 ITEMS! A real teaching aid. Full of ideas and materials for new crafts projects.

COVERS MORE THAN 40 CRAFTS! Simplifies detail amazingly. This one catalog is all you need to order tools and supplies for these crafts:

ART and DESIGN	BLOCK PRINTING	CERAMICS	LEATHER CRAFT
BASKETRY	BRAIDING	CORK WORK	METALCRAFT
BEADCRAFT	CASTING	CRAFTSTRIP	PEWTER
		WOOD CARVING	PLASTICS
		ETCHING	STENCILING
		FELT WORK	WEAVING
		FINGER PAINTING	WOOD BURNING
		JEWELRY	

MAIL THIS COUPON TODAY!

American Handicrafts Co., Dept. AVJ 9-7
45 So. Harrison St., East Orange, N. J.
Please send me your 80 page catalog.

Name.....
School.....
Address.....
City.....Zone..State.....

Write for New Price List

AMERICAN HANDICRAFTS CO., INC.
45-49 S. Harrison St., East Orange, N. J.

CLAMPS

"Jorgensen"
TRADE MARK REG U S PAT OFF

Genuine "JORGENSEN" Handscrews are the ones which will withstand "school shop service." To avoid future disappointment, be sure you ask for and get the genuine "JORGENSEN" every time.

They cost no more than any others.

Ask for them by name.

Write for No. 17 General Clamp Catalog

ADJUSTABLE CLAMP CO.
"The Clamp Folks"
424 N. Ashland Ave., CHICAGO 22, ILL.

PROMPT SHIPMENTS
from a
COMPLETE STOCK of
LARSON LEATHER

For everything in leather when you need it — consult Larson Leathercraft Headquarters. Wide line to choose from. Moderate priced tooling leathers as well as top quality calfskins.

We supply all tools, materials and instructions for making:

- GLOVES
- LINK BELTS
- PYROSTRIPS
- MOCCASINS
- BILLFOLDS
- WOOLSKIN TOYS and MITTENS
- COIN PURSES
- COMB CASES
- KEY CASES

MANY OTHER USEFUL ITEMS

Send for FREE catalog

J. C. LARSON COMPANY, Inc.
Dept. K — 820 S. Tripp Avenue Chicago 24, Ill.

ELECTRIC KILNS
LONG LIFE • RIBBON TYPE HEATING ELEMENTS • ANY SIZE
2000 F° to 2200 F° — Quick Delivery
JAMES W. WELDON
Laboratory
2315 Harrison St. Kansas City 8, Mo.

LOOMS, Table and Foot
Reed, Raphia, Handicraft Supplies
Send for catalog
J. L. HAMMETT CO.
CAMBRIDGE, MASS.

Sta-Warm
AUTOMATIC GLUE POTS
• Best for industrial arts. Temperature control is automatic — just plug into the wall outlet.
• No danger of burning the glue nor no danger of harming the pot should it be empty.
1 pint to 11 quarts
Deep or bookbinders style

STA-WARM ELECTRIC CO.—Ravenna, Ohio

TOOLS ALWAYS SHARP with PLURALITY OILSTONE TOOL GRINDERS

No. 450 Plurality Jr.

Now available in 3 sizes
No. 425 Plurality Sob Jr.
No. 450 Plurality Jr.
No. 475 Plurality

Grinding can be done on a cone, coarse or fine oilstone, leather stropping or emery wheels. Unit is compact, efficient, serviceable, easily accessible and has ball bearing direct motor drive. Especially guarded for school shop use. Details on request.

Mummert-Dixon Co. Hanover, Pa.
Originators and Pioneer Manufacturers of Oilstone Tool Grinders

ADVERTISERS' PRODUCTS AND SERVICES

Advertisers in this index are given a code number in addition to the page number on which the advertisement appears. Refer to the advertisement for product or services available. Write direct to advertisers or use the coupon in requesting information from a number of advertisers.

No. Code		No. Page
120	Adjustable Clamp Company	38A
121	American Art Clay Company	38A
122	American Gas Furnace	38A
123	American Handicrafts Co.	38A
124	American Steel Foundries, King Machine Tool Div.	27A
125	American Technical Society	34A
126	American Type Founders Sales Corp.	20A
127	Ammco Tools, Inc.	14A
128	Armstrong Bros. Tool Co.	2A
129	Atkins and Company, E. C.	40A
1210	Atlas Press Company, The	3A
1211	Badger-American Electrotype Co.	38A
1212	Black and Decker Mfg. Co.	11A
1213	Boice-Crane Company	30A
1214	Brodhead-Garrett Company	31A
1215	Bruce Publishing Company	35A & 3rd cover
1216	California School of Screen Process	36A
1217	Cincinnati Tool Company, The	4A
1218	Columbian Vise & Mfg. Co.	8A
1219	Designers Company	36A
1220	DeWalt Products Corp.	7A
1221	Dick Company, A. B.	15A
1222	Dietzgen Company, Eugene	2nd cover
1223	DonJer Products	33A
1224	Driscoll & Co., Martin	38A
1225	Engineering Manufacturing Co.	35A
1226	Foley Lumber Company, T. A.	36A
1227	Foley Manufacturing Co.	5A
1228	Gearon Company, The	37A
1229	General Electric Company	19A
1230	General Finishes Sales & Serv. Co.	34A
1231	Giles and Kendall Co.	38A
1232	Greenlee Tool Co.	31A
1233	Hammett Company, J. L.	39A
1234	Harper Electric Furnace Corp.	24A
1235	Higgins Ink Co., Inc.	33A
1236	Jam Handy Organization	21A
1237	Indianhead Archery & Mfg. Co.	38A
1238	Johnson Gas Appliance Co.	6A
1239	Kester Solder Company	18A
1240	Larson Co., J. C.	39A
1241	LeBlond Machine Tool Co., R. K.	4th cover
1242	Lipe-Rollway Corporation	8A
1243	Lufkin Rule Company, The	10A
1244	Macmillan Company, The	28A
1245	Mastercraft Manufacturing Co.	36A
1246	McKnight and McKnight	37A
1247	Meissner Mfg. Div.	25A
1248	Metal Crafts Supply Co.	36A
1249	Metal Goods Corporation	24A
1250	Millers Falls Company	16A
1251	Milwaukee School of Engineering	31A
1252	Morgan Vise Company	34A
1253	Mummert-Dixon Company	39A
1254	Nicholson File Company	12A
1255	Oliver Machinery Co.	6A
1256	O'Neil-Irwin Mfg. Company	2A
1257	Osborn Bros.	38A
1258	Parks Woodworking Machine Co.	5A
1259	Paxton Lumber Co., Frank	32A
1260	Pevar and Gottlieb	38A
1261	Plastic Parts & Sales	37A
1262	Plastic Supply Company	36A
1263	Plomb Tool Company	10A
1264	Pratt, G. A.	38A
1265	Proto Tools	10A
1266	Rockwell Mfg. Company, Power Tool Division	17A
1267	Russo Handicraft Supplies	38A
1268	Sheldon & Co., E. H.	26A
1269	Sheldon Machine Co., Inc.	22A
1270	Skilsaw, Inc.	40A
1271	Snap-On Tools, Inc.	2A
1272	South Bend Lathe Works	1A
1273	Stanley Electric Tools Div.	6A
1274	Stanley Tools	4A
1275	Starrett Co., The L. S.	23A
1276	Sta-Warm Electric Company	39A
1277	Sterling Wheelbarrow Co.	36A
1278	Sunbeam Corporation	8A
1279	Testor Chemical Co.	36A
1280	Tycon Company, The	38A
1281	Universal Scientific Company, Inc.	28A
1282	Vocational Guidance Films, Inc.	28A
1283	Walker-Turner Div., Kearney-Trecker Corp.	9A
1284	Wallace Company, J. D.	33A
1285	Weber Company, F.	35A
1286	Weldon Laboratory, James W.	39A
1287	Western States Envelope Co.	37A
1288	Weston Electrical Instrument Co.	10A
1289	Wisconsin Laboratories, Inc.	38A
1290	Woodworkers Tool Works	4A
1291	Yates-American Machine Co.	29A

USE THIS COUPON

The advertisements in this issue have been given a code number for your convenience in requesting information on products, services, booklets, and catalogs offered. Encircle the code number of the advertisement in which you are interested, clip and mail the coupon to INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. Your request will receive prompt attention. BRUCE-MILWAUKEE.

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION 1949
540 North Milwaukee St., Milwaukee 1, Wis.

Please send information offered in the advertisements we have encircled

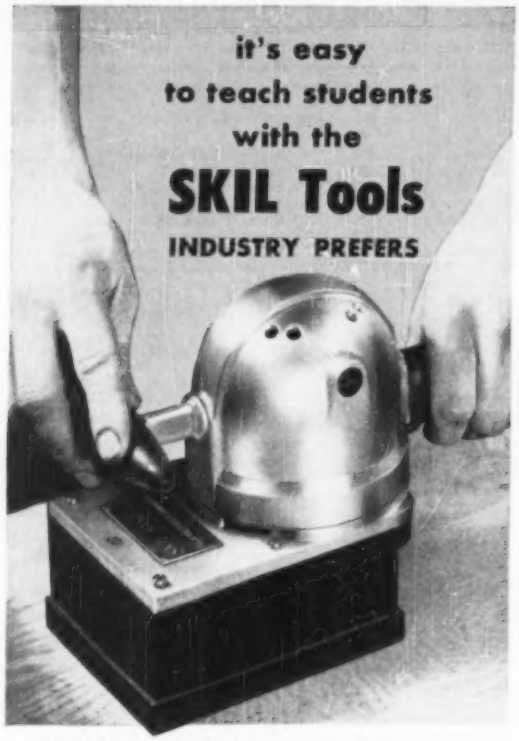
120	1211	1222	1232	1242	1252	1262	1272	1282
121	1212	1223	1233	1243	1243	1263	1273	1283
122	1213	1224	1234	1244	1254	1264	1274	1284
123	1214	1225	1235	1245	1255	1265	1275	1285
124	1215	1226	1236	1246	1256	1266	1276	1286
125	1216	1227	1237	1247	1257	1267	1277	1287
126	1217	1228	1238	1248	1258	1268	1278	1288
127	1218	1229	1239	1249	1259	1269	1279	1289
128	1219	1230	1240	1250	1260	1270	1280	1290
129	1220	1231	1241	1251	1261	1271	1281	1291
1210	1221							

Also information on .....

Name .....
Please Print

Title ..... School .....

City ..... Zone ..... State .....



SKIL Oscillating Sander

is light... fast... easy to handle

You can't beat SKIL Oscillating Sander for shop training. Its two-way sanding action helps even newest students do perfect sanding at once. (*Leading edge sands circularly, and trailing edge rubs with a reciprocating motion.*) Operator just guides SKIL Oscillating Sander over the work . . . quickly and easily . . . for finishes the finest craftsmen would envy.

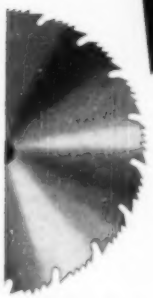
SKIL Oscillating Sander fits school budgets, too. Powerful and quality-built of best materials to stand up better and give longer trouble-free service. Ask your SKIL Tool Distributor for a demonstration *today!*

SKIL Tools are made only by
SKILSAW, INC.
5033 Elston Avenue, Chicago 30, Ill.
Factory Branches in Principal Cities
In Canada: SKILTOOLS, LTD., 66 Portland St., Toronto, Ont.

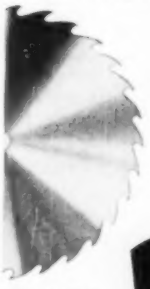
ELECTRIC **SKIL Tools** PNEUMATIC
TRADE-MARK

Helps the Pupil... Helps the Teacher

ATKINS "Silver Steel" CIRCULAR SAWS



ATKINS No. 37 Tooth Mitre Saw



ATKINS No. 2 Rip Saw

● There's no better way to arouse a shop student's interest than to give him good tools to work with. For example, a saw that cuts clean, fast and true . . . an *Atkins "Silver Steel" Circular.* Atkins cutting performance helps the pupil learn faster, because he gets good results right from the start. The Teacher's job is made far easier. Atkins help the school budget, too, because of the way their "Silver Steel" holds an extra-keen edge under hard usage. Judged by any standard, it's good practice to specify Atkins.

NOTE: While Atkins manufactures saw blades and tools for every cutting job, it does not manufacture power saw machines. It does, however, furnish blades to many of the leading manufacturers of such machines.

ATKINS

ATKINS

E. C. ATKINS AND COMPANY
Home Office and Factory
402 S. Illinois Street, Indianapolis 9, Indiana
Branch Factory: Portland, Oregon
Branch Offices: Atlanta • Chicago • New Orleans • New York • San Francisco
MAKERS OF BETTER SAWS FOR EVERY CUTTING JOB

An excellent two-year program

MECHANICAL DRAWING

by Edward Berg

Books I and II—Revised and Enlarged

A two book edition for the secondary school that meets the best current thinking in the field from the standpoint of content and improved methods of presentation.

Paper: Vol. I, 88 cents; Vol. II, 80 cents
Complete Edition: Cloth, $2.56; Paper, $1.80

For seventh and eighth grades

BASIC MECHANICAL DRAWING

by Glenn N. Schaeffer

Written especially for beginners at the 7th and 8th grade level, this text is devoted to those principles and processes which are basic to the field of mechanical drawing regardless of the pupil's later field of specialization.

96 cents

A complete course for high schools

PRINCIPLES OF WOODWORKING

Revised and Enlarged
by Herman Hjorth

This recently revised and enlarged edition provides an up-todate and comprehensive presentation of all hand and machine processes, materials, representative projects, etc., required for a complete high school course in woodworking. $2.88

Procedure in elementary woodworking

BASIC WOODWORKING PROCESSES

Revised Edition
by Herman Hjorth

A "process" book which lists, describes, and illustrates the most important hand tool operations and jobs that the student of woodworking must learn. $2.00

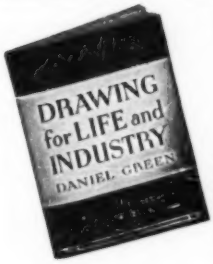
All typical operations from rough stock to final assembly

INSTRUCTIONAL UNITS IN HAND WOODWORK

by A. G. Brown and F. E. Tustison

Twenty-nine instructional units covering the entire range of hand woodwork with special application to projects that interest boys. Each step is clearly indicated and there are profuse illustrations. $1.88

Drawing useful in all fields



DRAWING FOR LIFE AND INDUSTRY

by Daniel Green

Here is a text for beginners in mechanical drawing. It is directed toward the ordinary person in his normal life situations. Well organized in terms of graded, logically arranged projects. $1.56

Indispensable for beginners

OPERATIONS OF COMMON WOODWORKING MACHINES

by Herman Hjorth

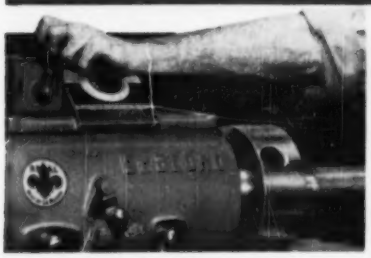
Designed for use in high school woodworking shops, this book describes in beginners' language the machines and the principal operations of woodworking, as well as step-by-step directions for using these machines.

Paper, $1.72; Cloth, $3.00

At the A.V.A. Convention — Stop at Booth No. 31

Write for examination copies of the texts described above. We will glady send them without obligation for 30 days' study. Catalog of complete publications covering all areas of industrial arts and vocational education free on request.

"turning tips for trainees"

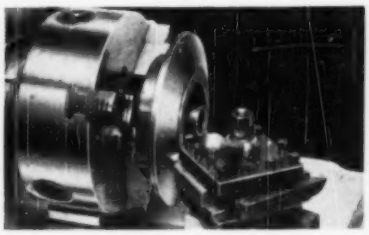


STOP YOUR MACHINE BEFORE YOU ... (1) Caliper your work, (2) Clean chips from work or tool, or (3) Oil or wipe machine.

COLLEGIATE DRAPE SHAPE is not fashionable in work clothes. Wear tight fitting clothes with no tie, or tie tucked in. Roll up your sleeves.

JEWELRY IS EXCESS BAGGAGE! Don't wear rings, wrist watch or pocket chain. You might get in the whirl of things before you know it.

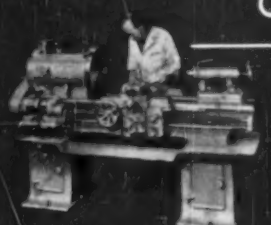
SAVE YOUR EYES. They're the only pair you'll ever have. Wear goggles when your operation makes the chips fly.



CHUCK WORK SECURELY. Use steady and follow rests on long shaft jobs. Be sure tool is in correct position.

KEEP FLOOR CLEAN. Wipe up oil, it's slippery! Keep chips in a neat pan and empty often.

Safety makes Regal the perfect training lathe ...



LeBLOND